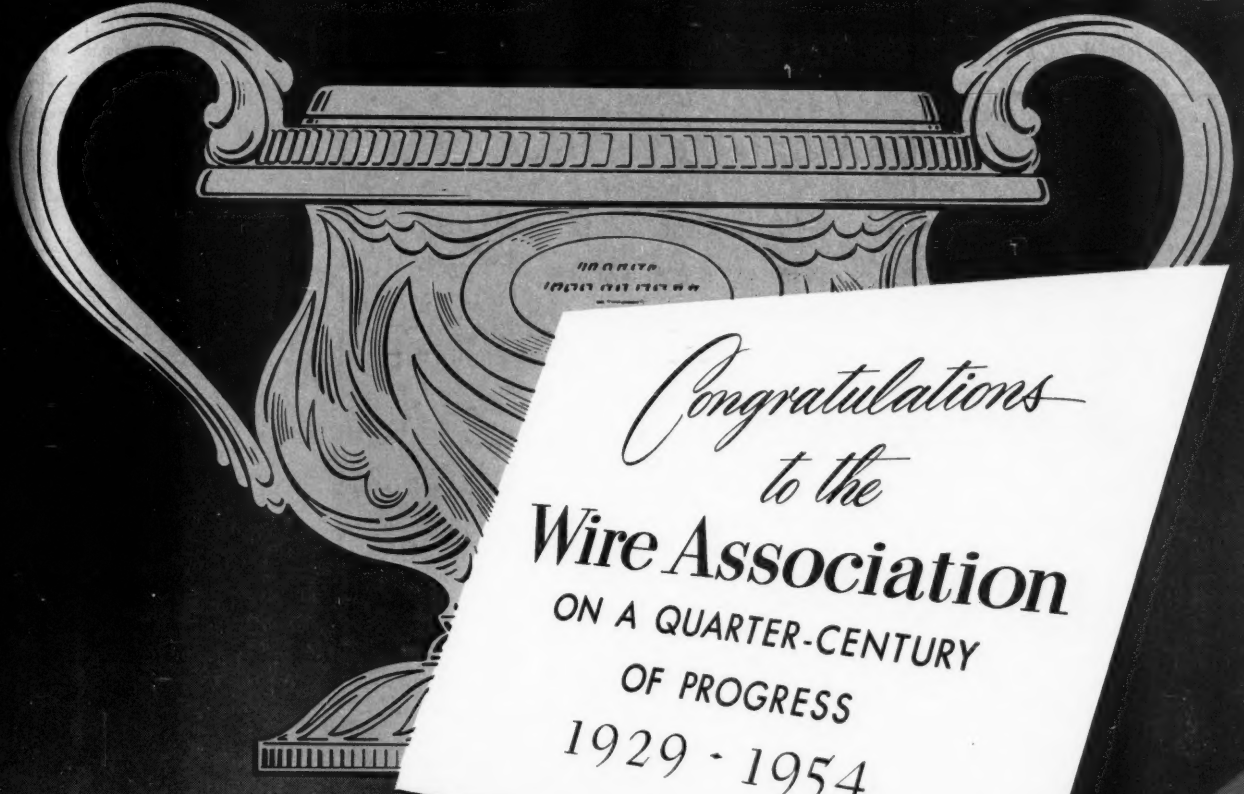
WIRE AND WIRE PRODUCTS

OCTOBER 1954



Congratulations to the
Wire Association
ON A QUARTER-CENTURY
OF PROGRESS
1929 - 1954

Since 1871

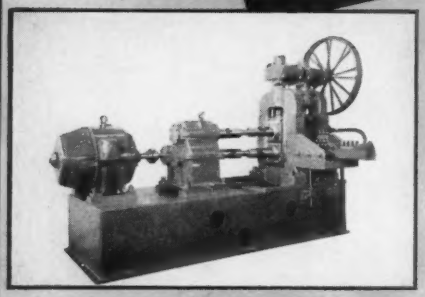
Vaughn®
Machinery

FROM THE LARGEST TUBE OR BAR TO THE FINEST WIRE

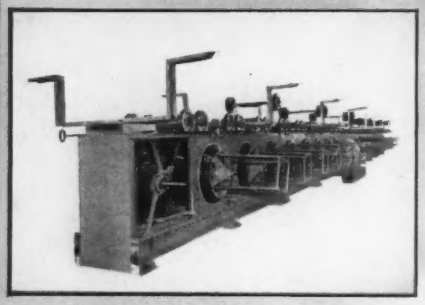
OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

LOOK TO Wean FOR WIRE MACHINERY

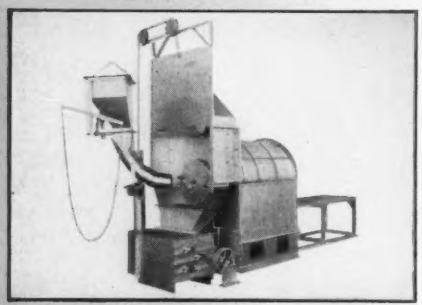
Process OR Product



2—Hi Wire Flattening Mill



Wire Galvanizing Take-Up Frame

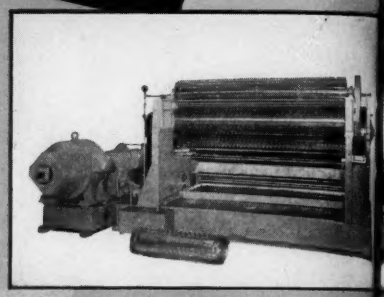


Nail Galvanizing Unit

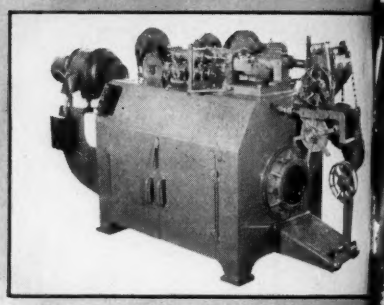
In the past few years tremendous progress has been experienced in the field of wire machinery. Production speeds have been tripled and quadrupled. Product quality has been greatly improved. Machines have been made easier to operate and maintain.

The Wean Equipment Corporation has been a large contributor to this advancement. Wean wire mill specialists have designed, built, and installed wire mill equipment for the leading wire producers the world over. If you make wire you should look to Wean for the best in machinery, service, and facilities.

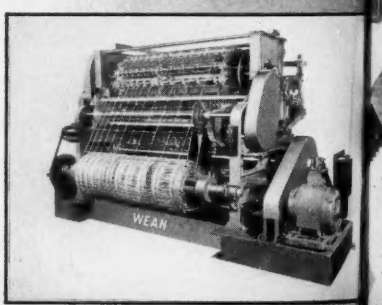
STRIP MACHINERY



Hexagon Netting Machine



2 or 4—Point Barbed Wire Machine



Hinge — Joint Fence Machine

Wean Equipment Corporation
CLEVELAND, OHIO

ABOUT FULL HEADS AND SMOOTH THREADS

It is estimated that approximately two percent of the metal in the fabricated product of today is in the fasteners. Manufacturers of products that are assembled of a great many parts know the value of a good fastener.

Bolts, for example, must be exacting in uniformity, especially for mass production assembly. The heads must be full formed and perfectly shaped for reasons of appearance as well as high speed assembly. Threads must be uniform and burr-free, so that parts go together effortlessly.

Manufacturers of bolts spheroidize their wire and rod, alter the structure of the metal itself to improve its flow, in order that they may cold forge perfectly formed bolts at great speeds.

Altering the metal structure uniformly requires controlled annealing, and controlled annealing at reduced costs is a Lee Wilson specialty. That's why, today, more wire and rod is annealed in Lee Wilson furnaces than in any other make.

**Bolt samples on this page through the courtesy of The Lamson-Sessions Co., Cleveland, Ohio, one of the many nationally known screw products manufacturers relying on Lee Wilson annealing furnaces.*

LEE WILSON ENGINEERING CO., INC.
Cleveland 16, Ohio

Lee Wilson
CONGRATULATES
WIRE ASSOCIATION
ON THEIR SILVER ANNIVERSARY

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Experience — Over 50 years of engineering and producing every conceivable type and size of steel spool, reel and bobbin for the wire industry.

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- Stranding Reels
- Take Off Reels
- High Speed Wire Drawing Reels
- Vulcanizing and Insulating Reels
- Pressed Steel Bobbins For Wire Weaving

. . . or you name it and we'll make it!

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if you need stainless wire — call CRUCIBLE for quick delivery

For any diameter from the smallest to half an inch or more . . . in any temper from dead soft to full hard . . . with a bright surface, or with one of many metallic or nonmetallic finishes — yes, for *any* stainless steel wire, call Crucible.

Crucible's modern stainless steel wire mill is the last word in up-to-date production facilities. What's more, this is combined with the very finest metallurgical and quality control setup you can find anywhere. It means, for you, that every coil . . . every length . . . *every inch* of Crucible stainless steel wire can be produced to the most rigid standards of quality — that Crucible stainless wire conforms to precise standards of uniformity that are unsurpassed in the industry.

So, whatever your requirements for stainless wire — cold heading . . . free machining . . . spring . . . rope . . . weaving . . . armature binding . . . slide forming — Crucible's fine new mill is ready to serve you promptly with wire products of the very highest quality. Call your nearest Crucible warehouse for prompt delivery.

CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking **STAINLESS STEEL WIRE**

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REX HIGH SPEED • TOOL • REZISTAL STAINLESS • MAX-EL • ALLOY • SPECIAL PURPOSE STEELS

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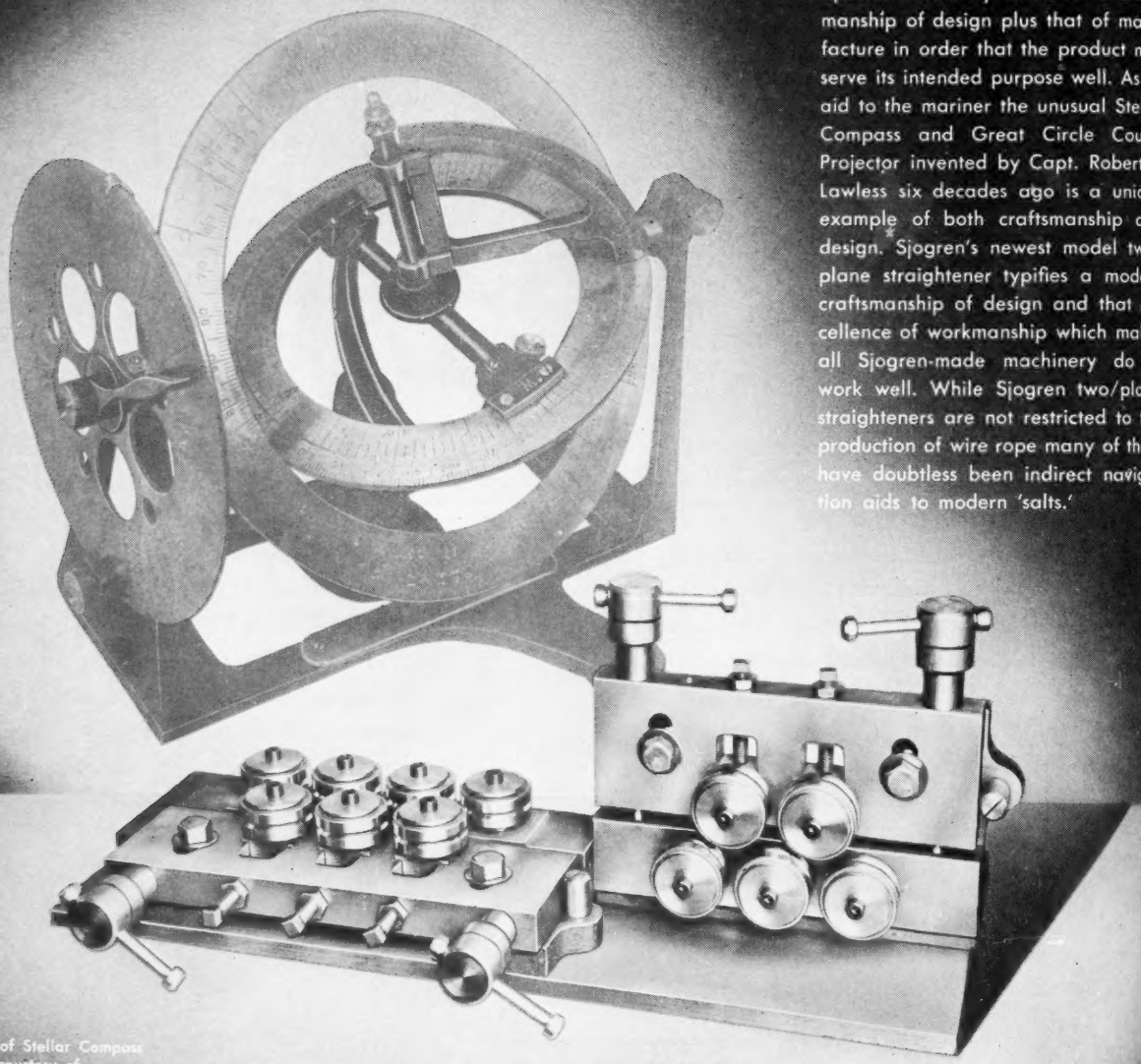
Sjogren WIRE MILL TOOLS

Used By Wire Men Who Want the Best!

CRAFTSMANSHIP

Special machinery demands a craftsmanship of design plus that of manufacture in order that the product may serve its intended purpose well. As an aid to the mariner the unusual Stellar Compass and Great Circle Course Projector invented by Capt. Robert T. Lawless six decades ago is a unique example of both craftsmanship and design. Sjogren's newest model two/plane straightener typifies a modern craftsmanship of design and that excellence of workmanship which makes all Sjogren-made machinery do its work well. While Sjogren two/plane straighteners are not restricted to the production of wire rope many of them have doubtless been indirect navigation aids to modern 'salts.'



Photograph of Stellar Compass by courtesy of Marine Historical Association, Inc., Mystic, Connecticut

SJOGREN TOOL AND MACHINE CO., INC.

Tools for the Wire Industries

14 SWORD STREET, AUBURN, MASSACHUSETTS

WIRE AND WIRE PRODUCTS*

Reg. U. S. Pat. Off.

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 29 OCTOBER, 1954 No. 10

Designated as Official Publication By The Wire Association

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COAT WITH BORAX 5 MOL.

Here are the advantages you get when your stock is Borax-coated...

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One dip puts on a Borax coat that is tight, yet pliable, and dries in a few minutes. It provides a good vehicle for your drawing lubricant and won't flake off. Borax-coated rods are a lot cleaner to handle in transit and are protected from rust while in storage. Try BORAX or BORAX 5 MOL on *your* stock!

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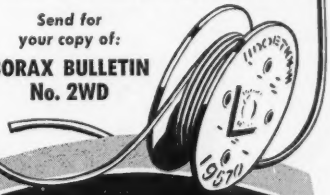
BORAX BULLETIN No. 2WD



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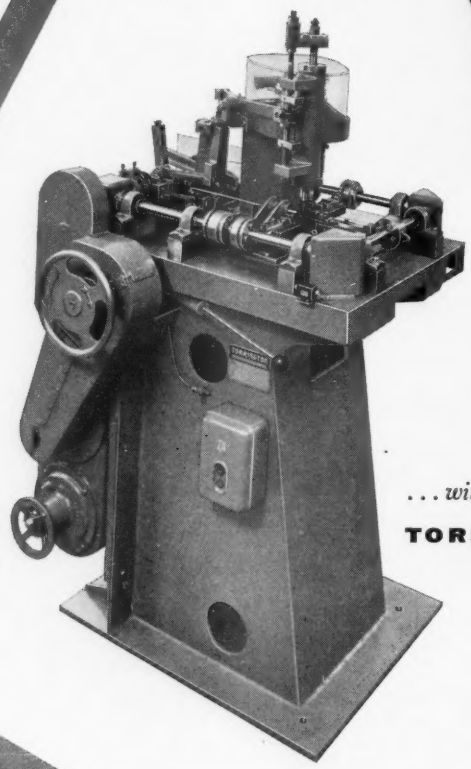
There's room for greater profits



...with the NEW Torrington W3001

TORSION SPRING WINDER

Room — room in which to work — is the outstanding feature of Torrington's new torsion spring winder. This modern, high production machine actually provides the largest tooling area ever devised. In addition, the W3001 offers many other advantages which will help spring-makers boost their production of torsion springs and reduce their costs at the same time.

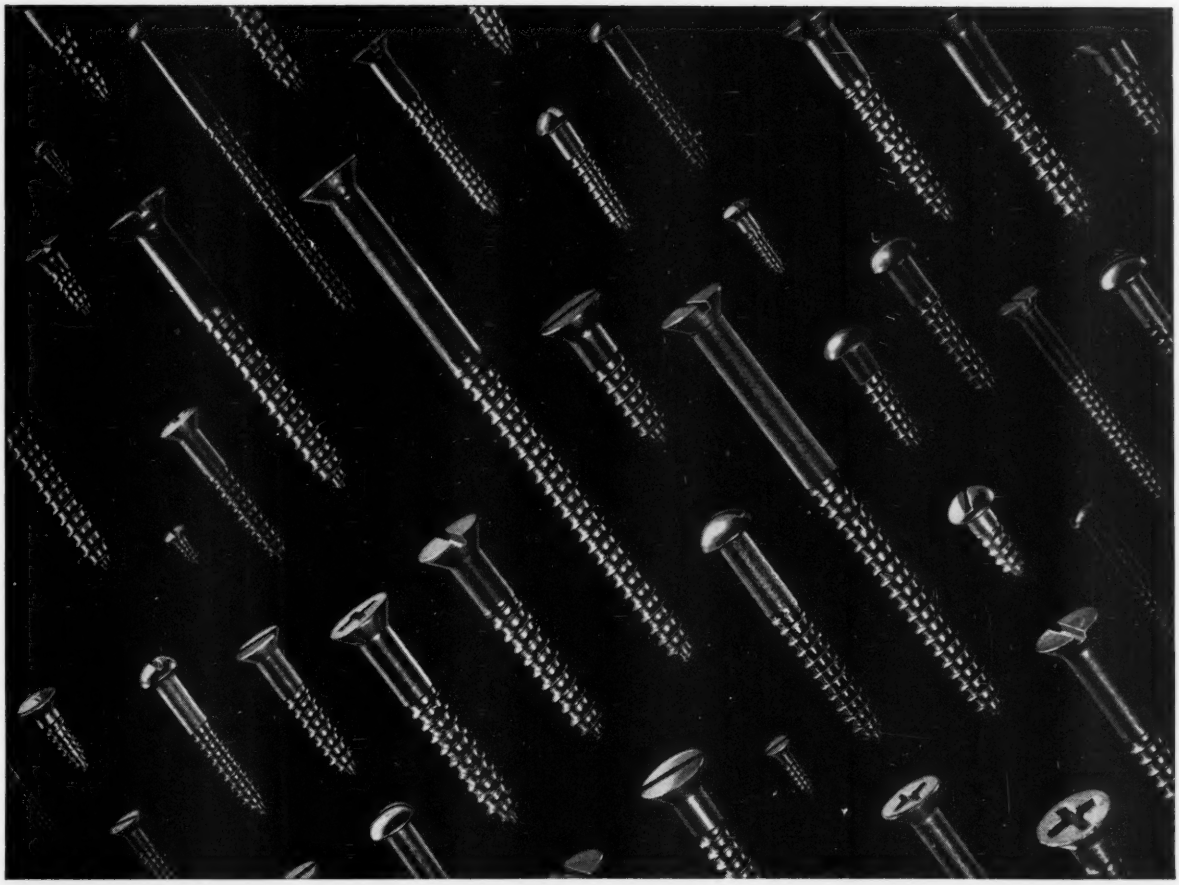
• Tooling area measures 12" by 18" • Tooling is faster and easier • Tools themselves can be made sturdier and more durable • Shafts on 3 sides plus vertical 2-slide attachment give great versatility in producing complex forms • Capacity extends to 10 turns of .080" wire, thus meeting the great majority of customer requirements for torsion springs • Rugged design means years of trouble-free operation with minimum downtime for maintenance and repairs.

The Torrington Manufacturing Company has built more spring coiling machinery since 1937 than all other manufacturers combined. The knowledge and skill gained while serving spring makers during this period has now been used to create a torsion winder which we firmly believe is the finest ever offered to the industry. If you manufacture torsion springs, this new machine will give you faster, more efficient production and unprecedented versatility to meet your customers' most exacting needs.

Call or write, *now,* for full information.

See the Torrington exhibit at the National Metals Exposition, November 1 to 5. Booth 2060, International Amphitheatre, Chicago.

THE
TORRINGTON
MANUFACTURING COMPANY
TORRINGTON · CONNECTICUT
WIRE FORMING MACHINERY DIVISION



A billion wood screws sold every 49 days

That's right! In 1953 sales of wood screws in this country totalled nearly 7½ billion, according to the U.S. Wood Screw Service Bureau.

Many leading manufacturers of wood screws and other fasteners rely largely on Bethlehem wire of cold-heading quality, which we furnish them in several different analyses and heat-treatments, depending upon the size, type of head, and kind of screw.

Screw wire is just one of many specialties that we produce regularly in our modern wire mills. Each kind of Bethlehem wire has the right strength, ductility, finish, and other properties required to give best results for a particular application. Tire-bead wire, for example. And wire for upholstery springs, for steel wool, brush handles, bicycle spokes and lock washers.

The steel wire that's best for your product is likely to be a grade and quality that we're producing right now. At your invitation we would be glad to have a Bethlehem man talk over your needs and give you full information.

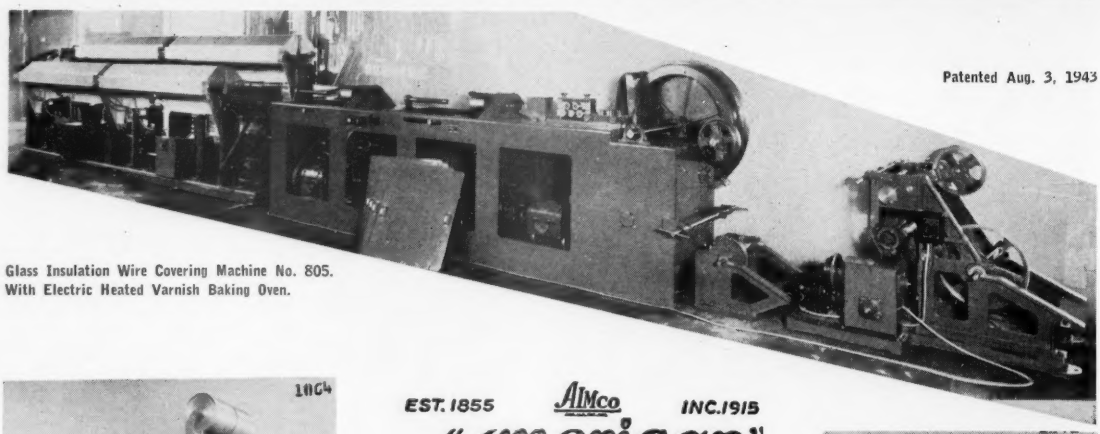
Perhaps he could help you solve a wire problem right now. Just phone the nearest Bethlehem sales office, or drop a line to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

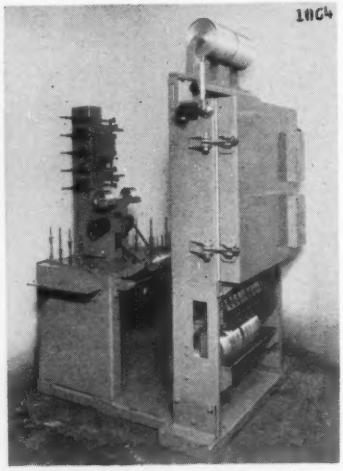
Bethlehem **COLD-HEADING WIRE**

BETHLEHEM STEEL



Patented Aug. 3, 1943

Glass Insulation Wire Covering Machine No. 805.
With Electric Heated Varnish Baking Oven.



M-10 Enameling Machine No. 1064. Built especially to apply enamel to extra fine diameter wires.

EST. 1855 AIMco INC. 1915

"American" AIM INSULATING MACHINERY COMPANY

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FAIRHILL AND HUNTINGDON STREETS

PHILADELPHIA 33 PENNSYLVANIA U.S.A.

WE SPECIALIZE IN
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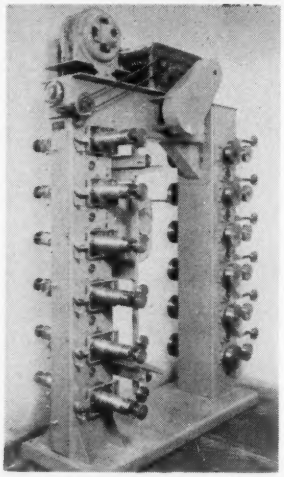
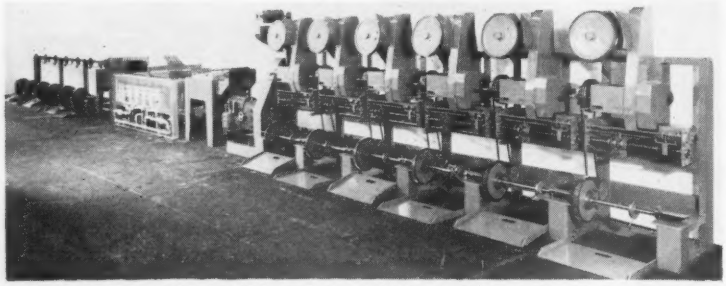
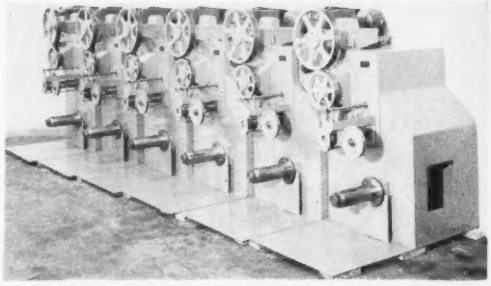
TINNING, INSULATING, TAPING,
GLASS-COVERING, PANNING,
AND ALLIED MACHINERY.



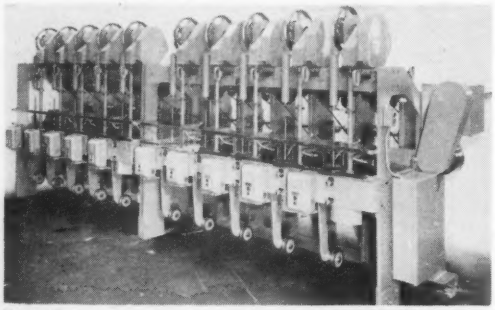
12 Unit Take-up Stand No. 1041. For use in wire tinning outfits, etc.



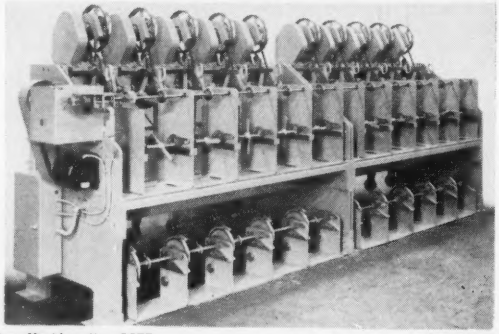
Heavy Wire Tinning Outfit No. 1010. With Gas Heated Tinning Tank and Automatic Heat Control.



Multiple Wire Take-up No. 1049. 6 individual units, each Reel-arbor torque motor driven. For use in wire tinning outfits, etc.



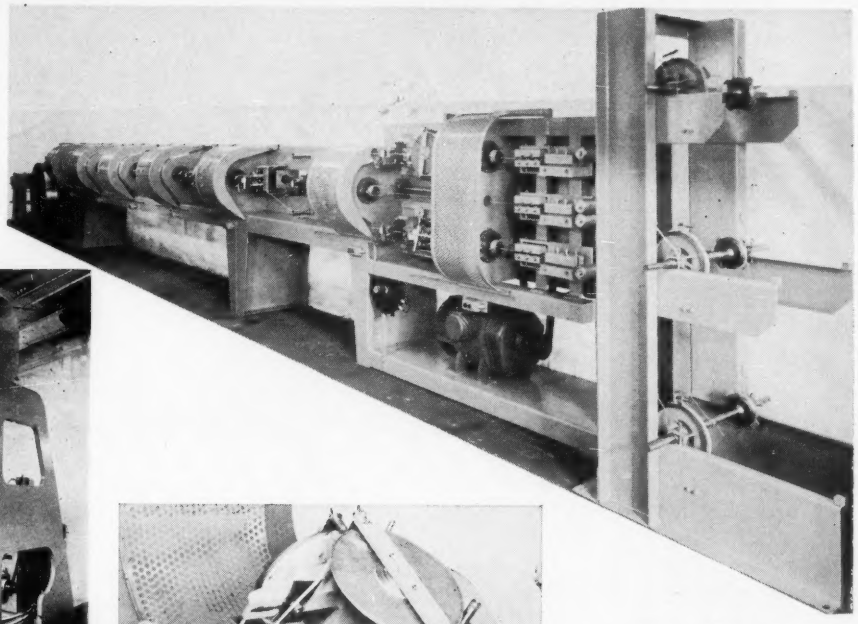
Front View

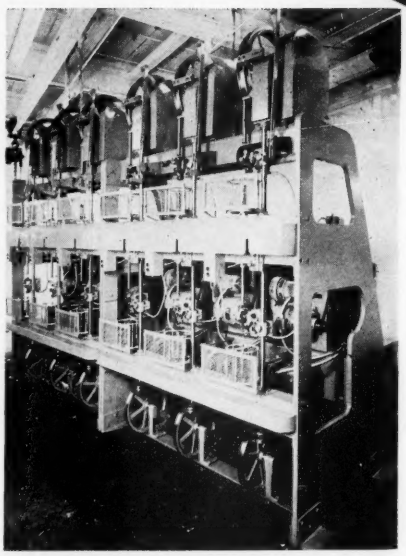


#2S-10-MBB Insulation Winding Machine No. 1077.
Applies a single cover to 10 lines of wire.

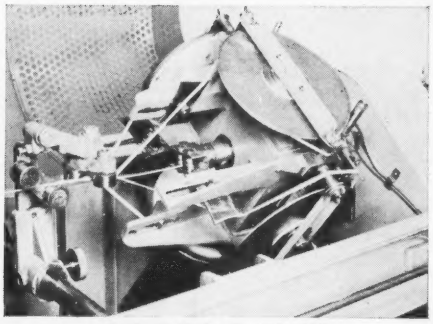
Rear View

4 M-T-BB Taping Machine No. 1105. Arranged for individual wire double taping, then combining and multiple tape covering.





Double Taping Machine No. 1107. Applies 2 tapes to each of 6 round or flat wires.



Quadruple Taping Head No. 889.

EST. 1868 AIMCO INC. 1915
"American" INSULATING MACHINERY COMPANY
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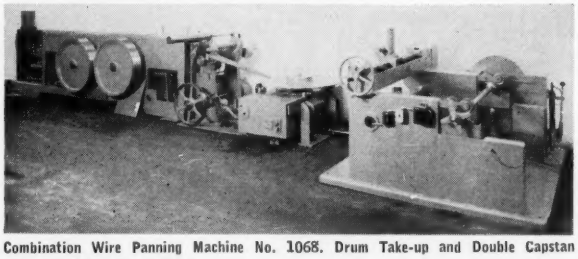
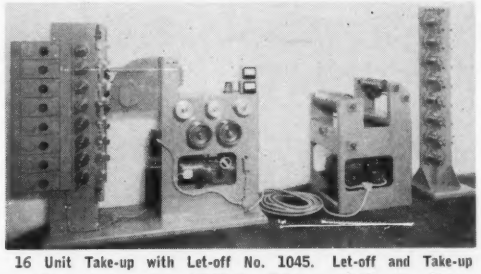
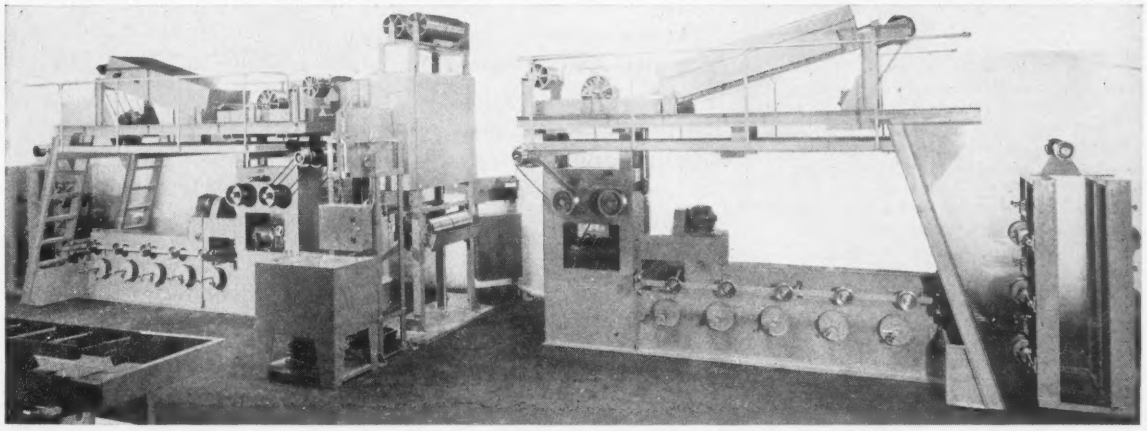
REFER TO NUMBERS



Combination Wire Panning Machine No. 1068. Drum Take-up and Double Capstan with Adjustable Speed Drive.

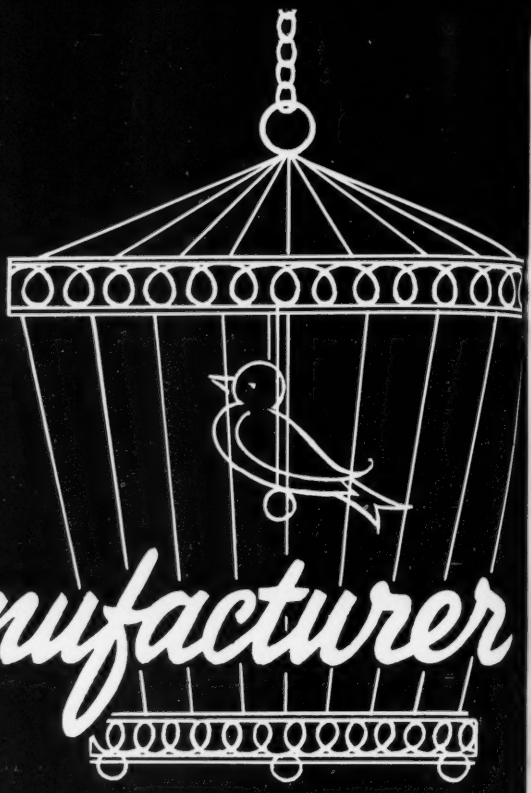


16 Unit Take-up with Let-off No. 1045. Let-off and Take-up capstan speeds are synchronized. Take-up spindles are Torque Motor driven.



Wire Enameling Machine outfit No. 997. With Pre-annealer, Storage, Circulating and Filter System for Enamel. Oven is higher than shown and is shortened to show top sheaves.

The pet theory... of a Bird Cage manufacturer



CONTINENTAL STEEL CORP. STEEL CONTINENTAL WIRE REG. U.S. PAT. OFF. KOKOMO, IND.

...he *insists* on "CONTINENTAL WIRE"®

How CONTINENTAL Wire Service Helps Regular Users

- Continental is geared to produce wire made to exacting analyses, tempers, finishes and shapes.
- Continental offers the services of metallurgists and mill technicians to help solve any problems customers may have pertaining to wire fabrication.
- Continental provides a follow-through service, on customers problems that involves real application engineering.
- Continental wire must be right for a particular product application—for it's made right.

• And well he should. Continental's continuing research and testing provides him with wire tailored to fit his product's needs . . . wire of a uniform quality that welds easily, securely and forms under stress without fracturing.

Why not make this insistence on Continental quality and service your pet theory, too? We've valuable case histories and experience gained in more than a half-century of wire making that we can bring to bear on your wire problem. Continental specializes in wire for thousands of applications in practically any size, temper, finish, shape and analysis in low carbon and medium low carbon steels. Let's talk over your wire problems.

Write or phone Continental at Kokomo, Indiana

CONTINENTAL STEEL

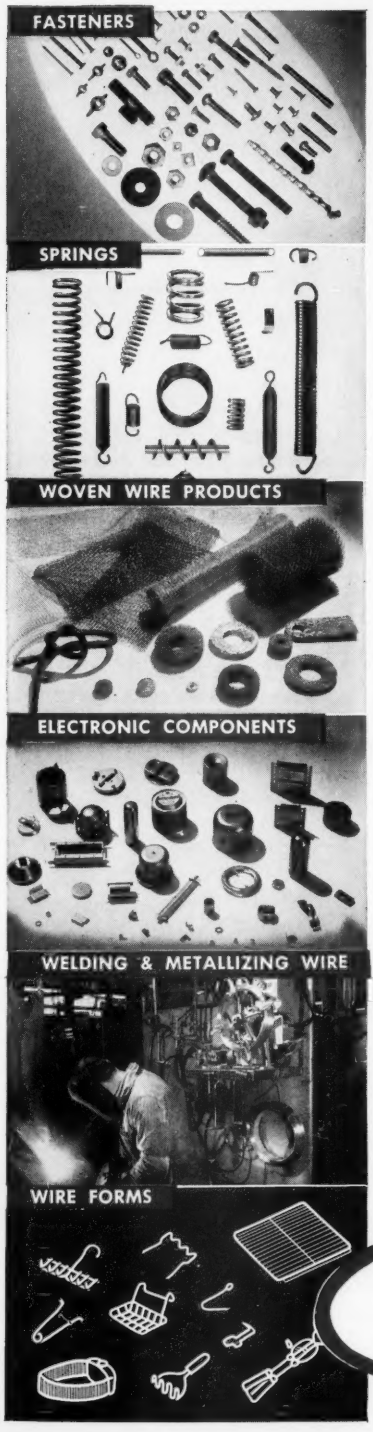
CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF Manufacturer's Wire in many sizes, shapes tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nail, Continental Chain Link Fence, and other products

Basic Materials

FOR A MILLION PRODUCTS



Alloy Wire, Rod and Strip . . .

Design Engineers are taking advantage of the outstanding mechanical and electrical properties and excellent formability of Alloy Wire, Rod and Strip. Results: Better products, smaller and lighter products, products that are more corrosion-resistant, more heat-resistant, more attractive —and more economical.

Alloy Metal Wire Division can supply you with high quality wire, rod and strip in Stainless Steels, Nickel Alloys and Electrical Resistance Alloys. Why not put these versatile materials to work for you?

SEND FOR FREE HANDBOOKS TODAY

FOR A BETTER DESIGN... *Use Wire, Rod, & Strip*

FOR BETTER PRODUCT PERFORMANCE... *Use Alloys*

Among the alloys we fabricate, you will surely find one with just the right combination of properties for your specific application. And you can profit from the fabrication advantages and material cost and weight savings of wire, rod and strip parts and assemblies. Select the alloy you need from these three functional groups:

STAINLESS STEELS—

Alloy Metal Wire Division can provide you with more than 20 different grades of stainless steels. These include the chromium-nickel Austenitic grades with their outstanding corrosion resistance and good mechanical properties; the high chromium Ferritic grades with their high heat resistance, corrosion resistance, and outstanding cold working properties; and the lower chromium Martensitic grades which can be heat treated to obtain exceptionally high strength and hardness in addition to good resistance to corrosion and high temperatures. Stainless steel Wire, Rod and Strip are used extensively for high strength and corrosion-resistant fasteners, springs and mechanical parts and for welding wire, woven and knitted wire parts, and many other applications.

NICKEL ALLOYS—

A wide variety of Nickel alloys are also available for hundreds of electrical and mechanical applications. The excellent electrical characteristics of nickel are especially advantageous for electronic tube parts, such as grids, cathodes, support rods and pins. Monel, because of its excellent corrosion resistance and good mechanical properties, is also used for many mechanical parts, fasteners and springs.

Inconel provides the valuable combination of outstanding heat resistance, corrosion resistance and high strength required in many applications.

RESISTANCE ALLOYS—

Five grades of electrical resistance alloys are now in production in wire, rod and strip form. These are: Alray A—20 Cr, 80Ni; Alray C—15 Cr, 62Ni, bal Fe; Alray D—18 Cr, 35Ni, bal Fe; Excelsior—45 Ni, 55 Cu; and Ni—Fe alloys.

These high quality alloys find extensive applications in the electrical and electronic fields.

SPECIAL WIRE SHAPES—

You can cut costs and improve product performance with Alloy Metal's Special Shaped Wire. Almost any cross-sectional shape can be made on our wire drawing equipment. These shapes can save you tons of metal and many hours of machining time. Shaped wire can be held to close tolerances and has a smooth, tough, flaw-free surface.

ALLOY METAL WIRE DIVISION

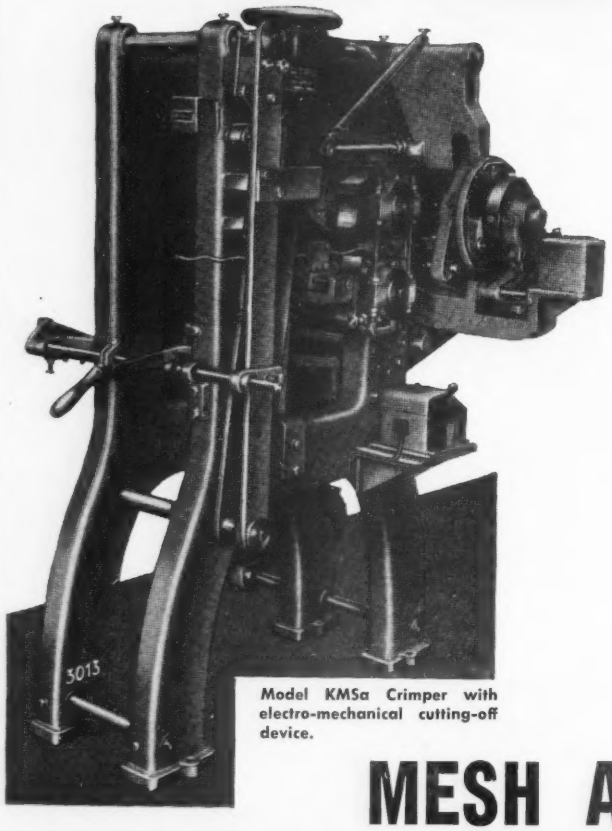
H. K. PORTER COMPANY, INC.

of Pittsburgh

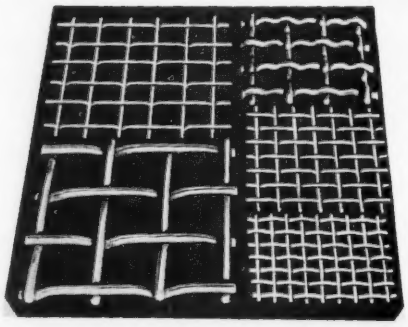
PROSPECT PARK, PENNSYLVANIA

2

JAEGER Automatic Crimpers



Model KMSa Crimper with electro-mechanical cutting-off device.

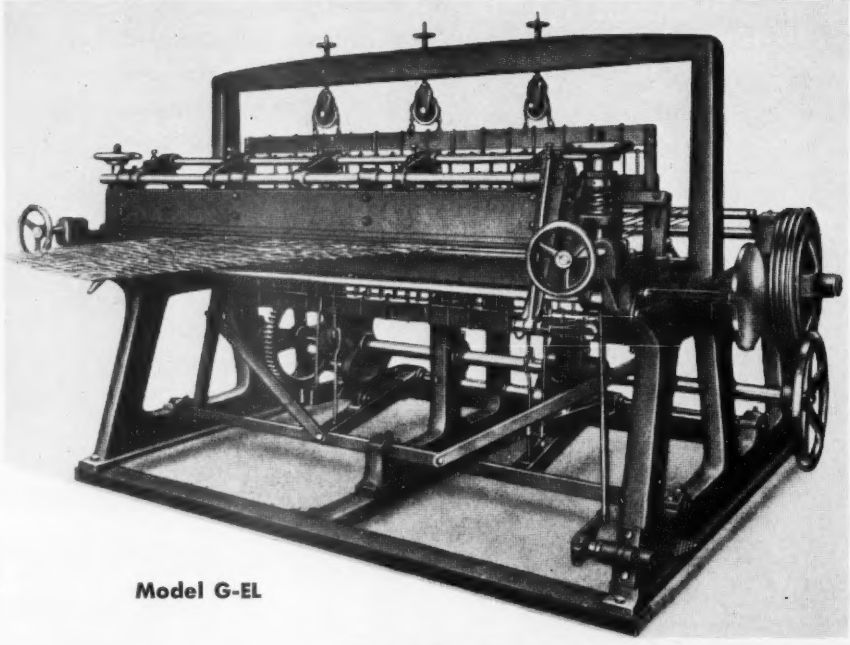


A complete line of Automatic Wire Crimping Machines, four sizes as follows:

Model KMM for wire up to abt 9/32″ diameter
Model KMS for wire up to abt 3/8″ diameter
Model KMSa for wire up to abt 15/32″ diameter
Model KMSS for wire up to abt 23/32″ diameter

MESH Assembling Looms

When inquiring please give full details of meshes to be made, i. e. size of meshes, maximum widths, wire sections, sizes of wire as well as kind of wire to be used, or submit samples.



Model G-EL

For producting crimped mesh screen with rectangular meshes with pre-crimped shoot and warp wires.

CEDAR-WEST TOOL CO. INC.
92 West Street
NEW YORK 6, N. Y.

SPECIAL JOB?

Get a special Chase alloy!

TELLURIUM COPPER

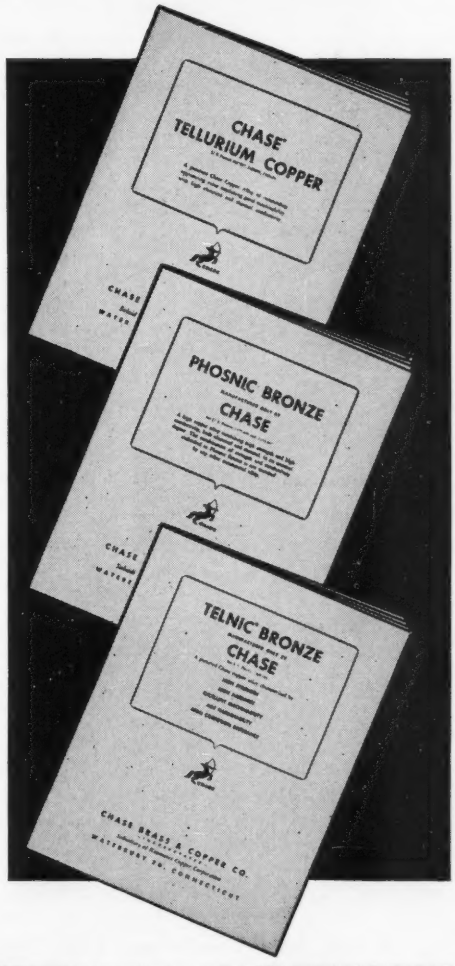
This alloy, developed by Chase, has excellent machinability *plus* high conductivity. Chase Tellurium Copper can be machined with tool speeds and settings similar to those used with Free-Cutting Brass, permitting high rates of production. But, unlike Free-Cutting Brass, Chase Tellurium Copper may be hot worked easily, and may be cold worked almost as extensively as pure copper. For Chase's free Tellurium Copper booklet, check the coupon below.

PHOSNIC® BRONZE

Chase Phosnic Bronze, an alloy made *only* by Chase, combines high strength and high conductivity to an amazing degree. This combination of high strength, high conductivity is *not matched by any other commercial alloy*. Chase Phosnic Bronze also has excellent workability, high corrosion resistance, and is available in tube, rod, and round or rolled flat wire. For Chase's free Phosnic Bronze booklet, check the coupon below.

TELNIC® BRONZE

By adding small, accurately proportioned amounts of tellurium, nickel and phosphorus to copper, Chase developed Telnic Bronze—a truly "all purpose" alloy. Chase Telnic Bronze has *excellent* machinability, hot and cold workability, high strength and conductivity, high fatigue strength and superior corrosion resistance. Chase Telnic Bronze is available in round or hexagonal rod. For Chase's free Telnic Bronze booklet, check the coupon below.



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FREE

Chase Brass & Copper Co.
Waterbury 20, Connecticut
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Gentlemen:

Please send me the following Chase booklets:

☐ TELLURIUM COPPER
☐ PHOSNIC BRONZE ☐ TELNIC BRONZE

Name_____
Position_____
Firm_____
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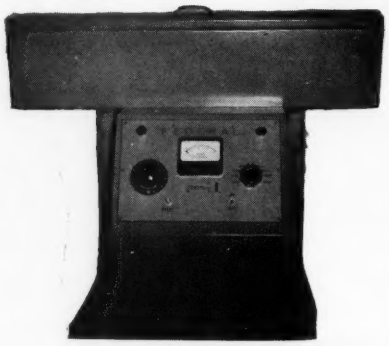
City_____ State_____

Federal EQUIPMENT for ELECTRIC WIRE

Model RS15

At Left: **FEDERAL RE-SPOOLING SPARKER (15,000 volts). Has slow start motor control • Jog and automatic knock-off • Wide sweep scale meter • Fused circuit—all wires code marked for easy maintenance • Electrodes for any speed desired • Lowest price—but with all standard features.**

At Right: **FEDERAL CV SPARKER. A completely new Spark Tester, with advanced design feature • Made for low voltage or high potential • Supplied with or without stand • Any size electrodes furnished for speeds desired.**



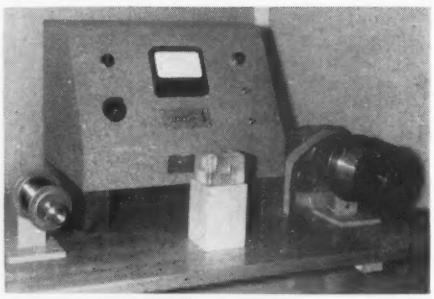
Model CV15

Dielectric Tester

At Left: **FEDERAL DIELECTRIC TESTER for testing Enameled Wire. Has ½KVA stepless range of 0 to 15,000 volts. NEMA SPEC 5.3.1.**

At Right: **FEDERAL HIGH POTENTIAL BREAKDOWN TESTER. 5KVA • Stepless range of 0 to 5,000 volts • Wide sweep meter • Fault light indicates failures • Automatic shut-off at faults • Mounted on casters for easy moving • Safety features reduce operating hazards to a minimum • Built to meet Underwriters' specifications • Reasonable in price.**

High Potential Breakdown Tester



Continuity Tester

To meet NEMA Specifications 5.3.2 range. 20 to 300 volts D.C., complete with mercury electrodes, pay-off and take-up. 110 volt fully automatic gearhead motor.

All FEDERAL Equipment is precision made to exacting standards to assure sensitive functioning in dielectric testing of electric wire. Such equipment has received wide and enthusiastic acceptance among wire concerns.

•

Other FEDERAL Equipment

Abrasion and Cord Set Testers
Measuring Machines • Take-Ups
Electrodes • Capstans

Export Agents:

Ballthrall Trading Company

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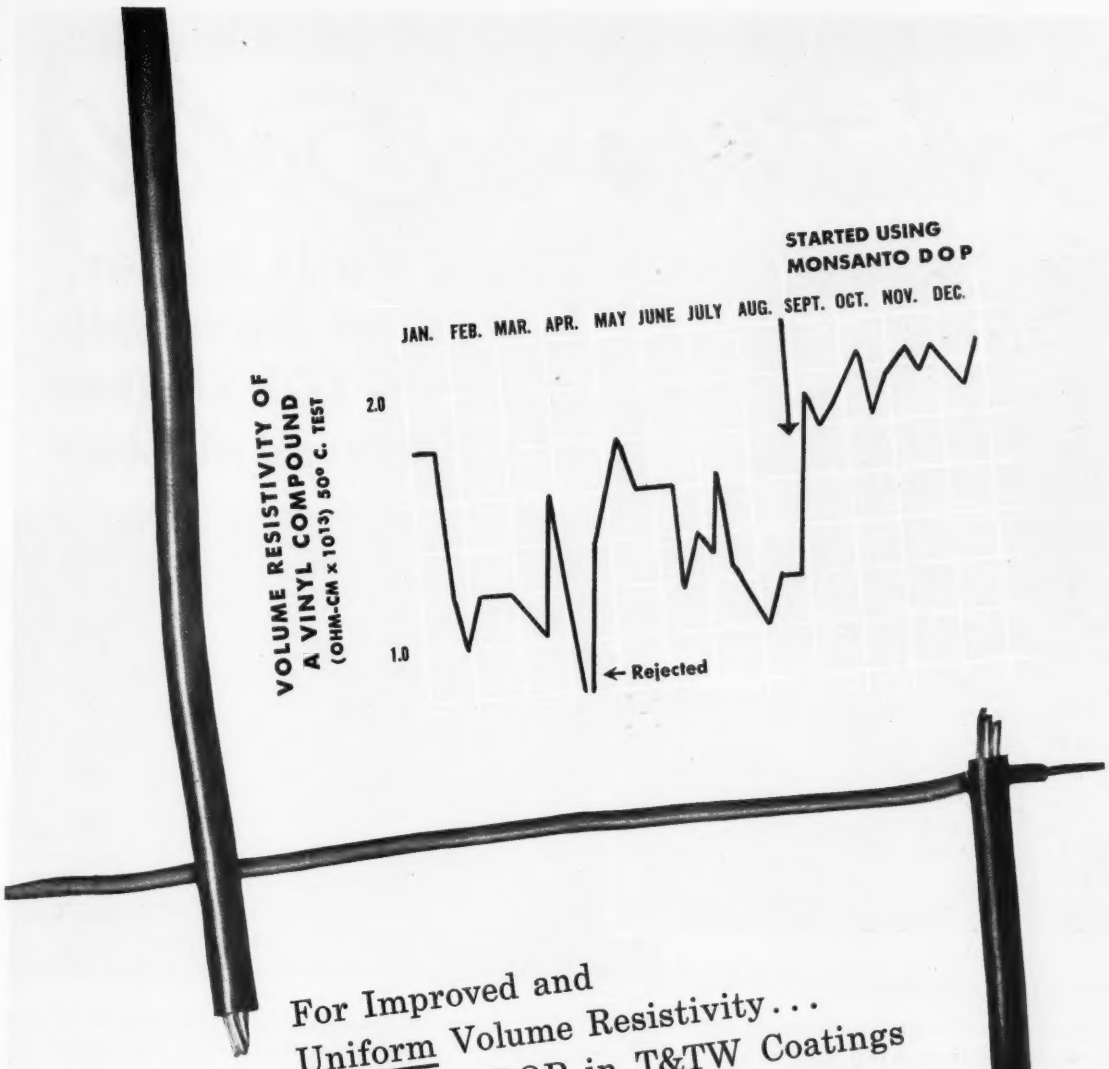
Federal Manufacturing Co.

SPECIAL WIRE MACHINERY

236-240 Hall Avenue, Wallingford, Conn.



For Improved and Uniform Volume Resistivity . . . Use Monsanto DOP in T&TW Coatings

Monsanto DOP imparts consistently high quality electrical characteristics to vinyl wire and cable compounds.

The graph clearly shows how one manufacturer was able to increase the volume resistivity of his compound for T&TW household wire coatings by using Monsanto DOP. In addition, Monsanto DOP increased uniformity and was superior with red pigments which have the greatest degrading effect on electrical properties.

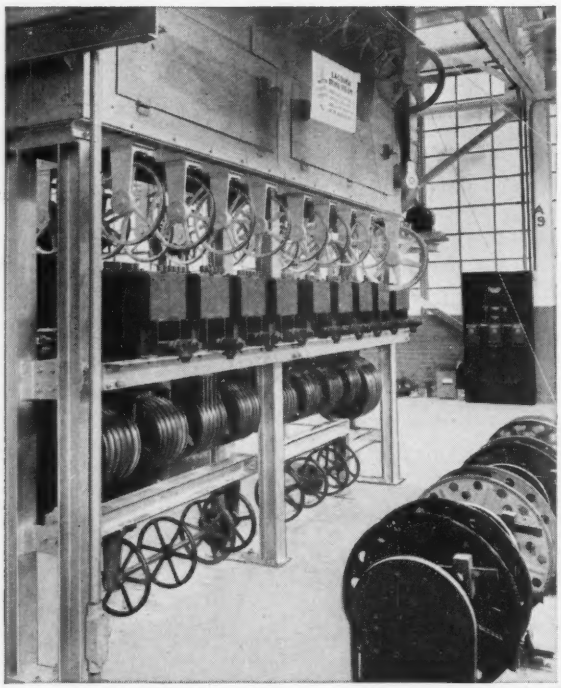
Evaluated in the compound — the place where it is most important — Monsanto DOP can't be topped for consistently high uniformity and quality. This manufacturer found that out by trying it. Why don't you?

For full information on how Monsanto plasticizers can help you, contact the nearest sales office or Organic Chemicals Division, MONSANTO CHEMICAL COMPANY, P. O. Box 478, St. Louis 1, Missouri.

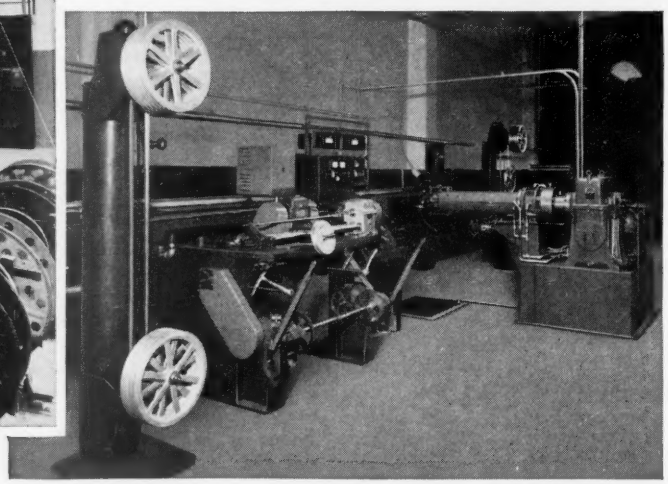
MONSANTO
CHEMICALS — PLASTICS

SERVING INDUSTRY . . .
WHICH SERVES MANKIND

WHETHER YOU COAT WITH *Solutions* OR *Solids*



You'll do it better, faster, at *lower cost* with an IOI coater of advanced design



ORGANOSOL COATER

The organosol system shown above will handle 9 ends of wire, each end being coated with as many as 8 individual coats. It is the thirty-second such system installed by IOI. Photograph shows the general arrangement of the coating pots, the wire travel, the bottom idler sheaves and the base of the evaporating tower.

EXTRUSION SYSTEM

Photograph above shows the takeup end of a complete extrusion line with nylon head tuber. Tension control stand and dual reel continuous takeup machine are shown in the left foreground. Driven letoff stand and tension stand are shown in background beyond the tuber.

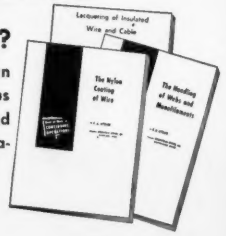
ARE YOU looking for ways and means of cutting production costs in your wire insulating operations? The largest wire mills in the world have found the answer to this problem by installing wire insulating systems and machines designed and built by IOI.

Whether your operations involve the extrusion of plastic tubing or strand, or the plastic jacketing of wire, cord or cable, or solution coating with lacquer, enamels, organosols or plastisols, there's an IOI unit of advanced design that will increase your production, cut your labor requirements and decrease your production costs.

The lacquering unit and extrusion system pictured are typical of IOI's developments in advanced engineering on sound basic principles, efficient design and rugged construction.

Do you want to cut production costs?

IOI's advanced engineering on sound basic principles can help you. Write for these valuable IOI booklets: "Continuous Automatic Processing Equipment", "Lacquering of Insulated Wire and Cable", "The Handling of Webs and Monofilaments", "The Nylon Coating of Wire."



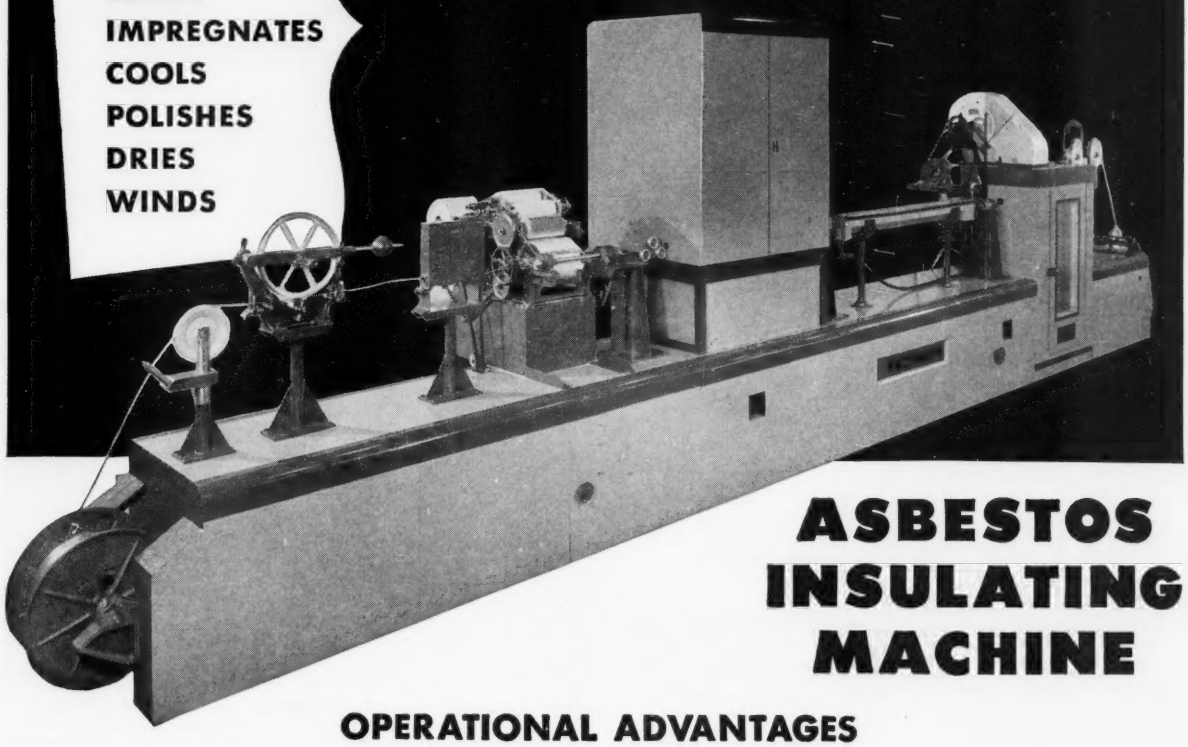
INDUSTRIAL OVENS, INC.

IOI ENGINEERING VERSATILITY

13807 TRISKETT ROAD CLEVELAND 11, OHIO

UNWINDS
WRAPS
CARDS
SLICKS
IMPREGNATES
COOLS
POLISHES
DRIES
WINDS

IN ONE *Continuous*
FAST OPERATION



ASBESTOS INSULATING MACHINE

OPERATIONAL ADVANTAGES

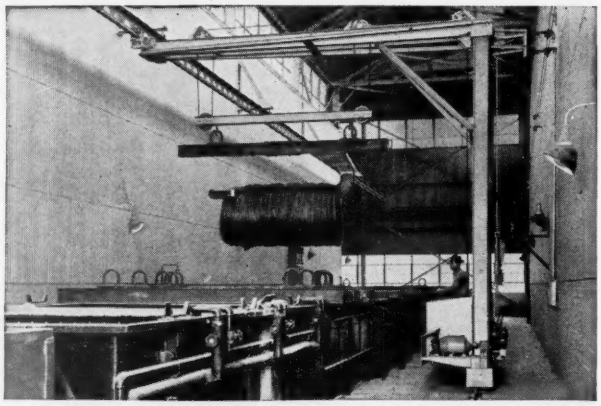
- High Wire Speeds
- Constant Tension Wire Handling
- Integrated Variable Speed Drive in Complete Machine
- Wide Flexibility in Wire Size and Asbestos Wall Thickness
- Operating Controls Conveniently Located in Base of Machine—Easily Accessible
- Utilizes Hot or Cold Saturants
- Rugged Construction
- Easy to Keep Clean and to Maintain

If you are interested in increased production and lower costs through the use of similar modern equipment, we'll be glad to send you further detailed information on this machine and many others IOI designs and builds for leaders in the wire industry. If you prefer, an IOI sales engineer will call at your request.

INDUSTRIAL OVENS, INC.
IOI ENGINEERING VERSATILITY
13807 TRISKETT ROAD CLEVELAND 11, OHIO

MATERIALS HANDLING IN THE WIRE INDUSTRY

Many wire and wire products plants are enjoying the numerous advantages possible with Cleveland Tramrail. They are speeding production and lowering costs by using larger production units, eliminating rehandling and reducing machine "shut-down" time. They are using overhead space to save floor space. They are promoting safety. In many instances they are eliminating need of plant expansion by installing Cleveland Tramrail.

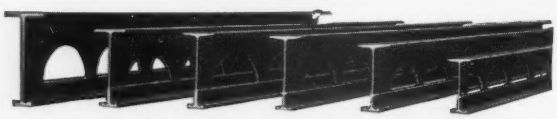


Cleveland Tramrail cleaning house gantry cranes boost production, cut costs sharply and greatly aid health and safety conditions.

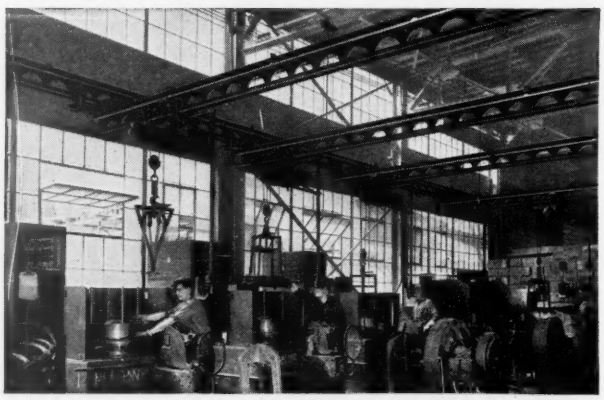
STANDARD ITEMS EASILY COMBINED TO HANDLE MATERIALS OF ANY KIND

Cleveland Tramrail raised-tread long-wear rail.

Cleveland Tramrail consists of standard items such as rail, switches, carriers, cranes, hoists, grabs, etc., which can be combined in a thousand-fold ways to serve nearly every materials handling requirement.

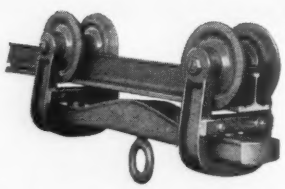


Cleveland Tramrail Archbeam in seven sizes for various loads and conditions.



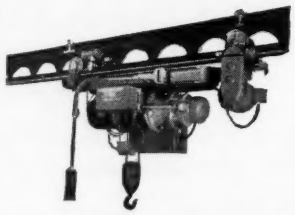
Providing each drawing block with an individual Cleveland Tramrail stripping crane speeds production and brings about sizable savings. Hernia injuries from heavy liftings are eliminated.

30,000 INSTALLATIONS



Hand propelled carrier built for long life and easy operation. Wheels have hardened tread and flange; bearings are double race type.

Backed by experience with 30,000 installations in industries of all types, Cleveland Tramrail representatives are in exceptionally good position to serve you. They will gladly advise, survey your plant, make layout or prepare quotation without obligation.



Motor-driven carrier with electric hoist. One of many types built by Cleveland Tramrail.

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BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
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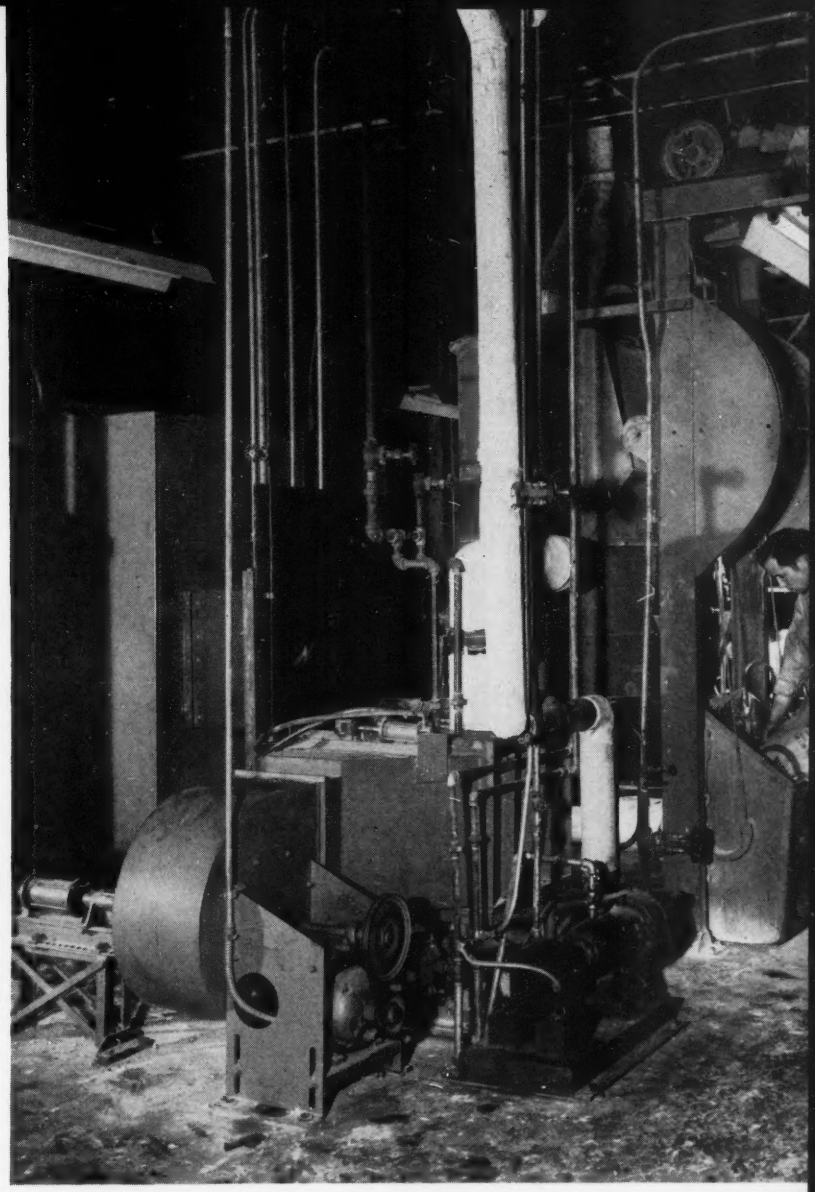
CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

5 to 15¢ per lb. saved

extrusion speeded 25%

WITH SPEEDMULLOR POWDER MIXES



FIVE TO FIFTEEN CENTS PER POUND saved with Special Speedmullor powder mixes as compared to the cost of Polyvinyl Chloride granules. The processing cost in the new Special Speedmullor is less than one-half cent per pound and yet mixing is so thorough that in recent comparative tests by several large processors only the Special Speedmullor proved acceptable.

The saving in cost is only part of the story. Important advantages are gained both in the mixing and the extrusion of Speedmullor powder mixes.

1. A 25% faster extrusion rate.
2. Colors are perfectly uniform and may be duplicated batch after batch.
3. Dielectric strength and other electrical properties are at least 10% higher than those obtained with PVC granules.
4. Products extruded from these powder mixes have greater elasticity and longer life.

An informative technical article describing the Special Speedmullor process of mixing Polyvinyl Chloride powders and the unique advantages of these powder mixes, is available without obligation. Write for your copy today.

BEARDSLEY & PIPER

DIV. PETTIBONE MULLIKEN CORP.
2424 N. Cicero Avenue
Chicago 39, Illinois

Fastest Process Annealing FOR COILED STEEL WIRE

- ✓ Annealing cycles accomplished in minutes rather than in hours
- ✓ 50% lower equipment cost
- ✓ less floor space
- ✓ no scale, decarburization, or other atmosphere effects

On-the-job production figures prove that no other method compares with an Ajax Electric Salt Bath Furnace in speed, uniformity, cost saving, and general all-around efficiency in process annealing all types of steel wire as well as aluminum, copper alloys, and silver alloys.

Heating cycles are far faster. Absolute uniformity is assured. Thanks to the exclusive Ajax electrodynamic stirring action, the temperature does not vary more than ±5°F. *in any part of the bath.*

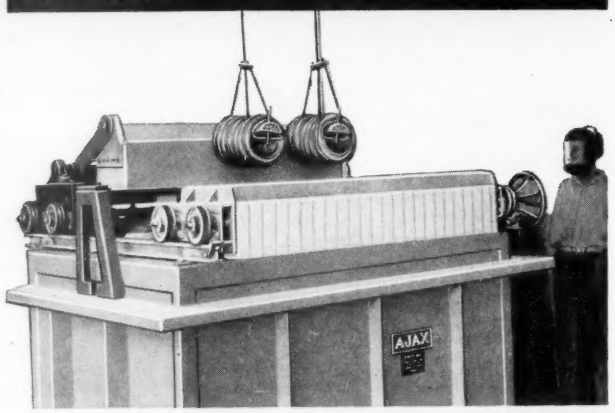
The Ajax Salt Bath eliminates all atmosphere with its accompanying problems of oxidation, pitting, and decarburization. Preservation of metal surface is assured. Equipment cost is much lower —and the Ajax handles more work for a given amount of floor space than any other method. Ajax Reprints 62 and 63 gladly sent on request.

LOW- AND HIGH-CARBON STEELS

This typical Ajax installation process anneals 1200 lb. 18-gauge wire an hour in only 58 feet of floor space.

STAINLESS STEEL

Annealing fine gauge nickel-chromium wire at 1950°F. Clean wire surface eliminates conventional pickling operations.



- **TOPS for WIRE PATENTING, too!**
- **IDEAL FOR DESCALING** hot-rolled stainless and alloy steel wire and other shapes employing either the Dupont sodium hydride or the Hooker Electrochemical Virgo bath.

Associate companies: Ajax Electric Furnace Corp. • Ajax Engineering Corp. • Ajax Electrothermic Corp.

AJAX electric SALT BATH furnaces

OVER 4,000 INSTALLATIONS . . . more than all other salt baths combined

AJAX ELECTRIC CO., Inc., 928 Frankford Ave., Philadelphia 23, Pa.

Textilene Glascor® Fillers

(FIBERGLAS CENTERED)

OFFER GREATER TENSILE STRENGTH WITHOUT CHANGE IN BULK

Textilene® Glascor Fillers—for all types of wire and wire cables—are made with a Fiberglas center for greater tensile strength. They have better stripping action, greater flexibility, unusual uniformity—at lower cost. Another feature is high resistance to dry rot, mildew and fungus attack.

Talk to Twitchell people about your filler requirements. They'll be glad to give you technical assistance. No obligation.

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Paper Products for the Wire Industry

TWISTED · FOLDED · PRESSED · CRUSHED · SHAPED · BRAIDED · WOVEN

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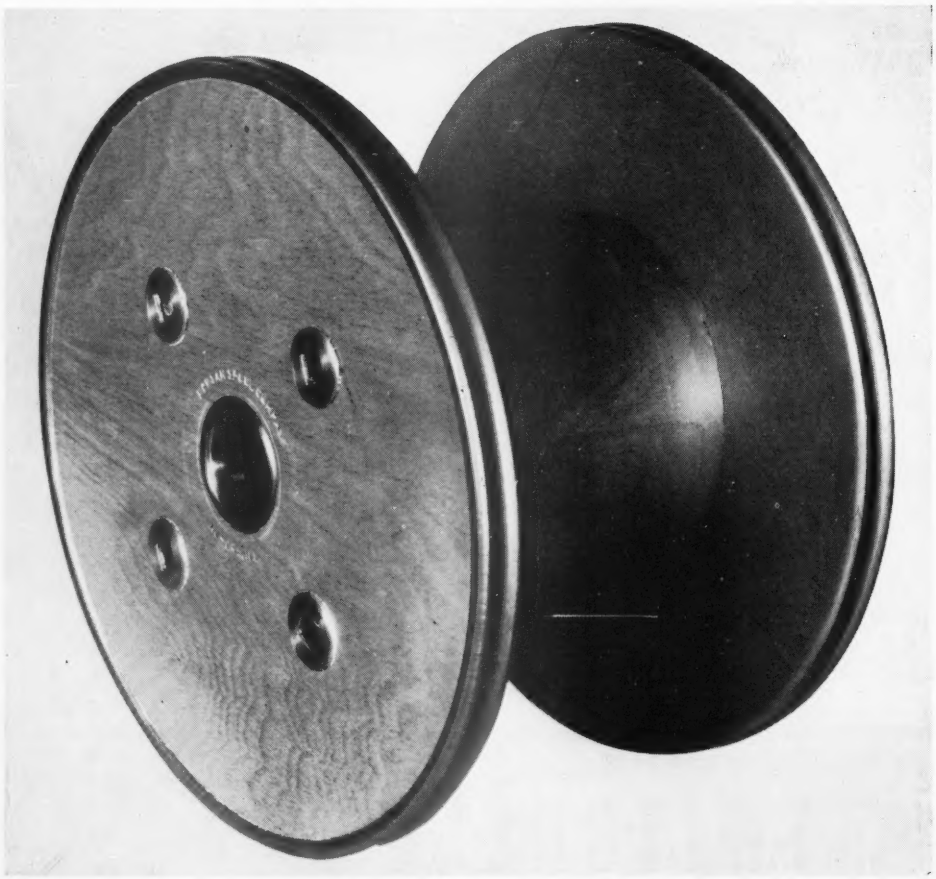
HOWSAM SPOOL COMPANY

500 RATHBONE AVENUE AURORA, ILLINOIS

For Reduced Maintenance Cost
Use The Reel With The
"PRESSURE PAD"* FASTENER



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SLICKEST TUBE DRAW COMPOUND YET!

For steel, brass, copper . . .

SHELL CALMA COMPOUND K, a new product of Shell Research, is the economical answer to trouble-free tube drawing in both plug-draws and die-sink operations on steel, copper, brass and aluminum tubing. It remains stable for long periods in high bulk temperature operations.

Calma K gives off no noxious odor or fumes in either neat form or in the emulsion . . . perfectly safe for handling under all plant conditions. It's easy to use. It requires no boiling or cooking . . . simply mix it with hot water from the tap and it's ready for use.

Write on your letterhead for a one-pound sample for your own evaluation.

SHELL Calma Compound K

CHECK ITS ODOR.. CHECK ITS LUBRICITY... CHECK ITS VERSATILITY

SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL

Specials!

In addition to a complete line of standard wire drawing and bar drawing machines, Ajax designs and manufactures special drawers to meet a wide variety of special requirements. Whether the need is for round, square, hex., keystone or rectangular section stock to close tolerances or whether the drawer is to be used in conjunction with cold headers, presses or special machines, Ajax can build it to meet the requirements and at a cost consistently low for the size and quality of the machine produced. If you have a need for drawing ferrous metals from 1010 to 52100 or non-ferrous metals with enough hardness to permit gripping, which is beyond the range of one of our standard drawers our engineers will be glad to discuss your particular requirement with you. We will be glad to send further information.

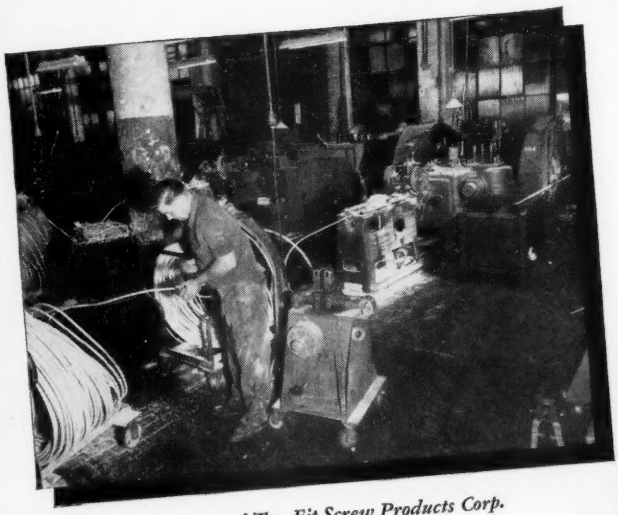
- **A** Bar Drawing and Straightening Machine
- **B** Drawing, Straightening and Cutting off Machine
- **C** for Drawing Keystone Stock
- **D** for large Waterbury-Farrel Nut Machine
- **E** for ½″ Nut Machine
- **F** for ¼″ Waterbury Header
- **G** for ⅜″ Waterbury Header
- **H** for No. 5½ Minster Press
- **I** for Double End Spoke Header
- **J** Continuous Drawing Machine
- **K** for ⅝″ Bolt Maker

THE *Ajax* MANUFACTURING CO.

Built 20 Years Ago
and
Still Going Strong

AJAX-HOGUE Wire Drawers

One of the first Ajax-Hogue Wire Drawers Built. Still in operation at the Chandler Products Corp. Cleveland, Ohio



Courtesy of Tru-Fit Screw Products Corp. Cleveland, Ohio

Courtesy of Chandler Products Corp. Cleveland, Ohio

These Ajax - Hogue Wire Drawers Have Been Drawing Accurate and Straight Wire from Coiled Rods for Cold Headers Since 1934

— write for Bulletin No. 111-A —

THE Ajax MANUFACTURING CO.

EUCLID BRANCH P. O.
CLEVELAND 17, OHIO

110 S. Dearborn St.
CHICAGO 3, ILL.

Dewart Building
NEW LONDON, CONN.

Users of **NOPCO® DD** *report:*

10% to 50% longer die life

in dry drawing steel wire

What are the reasons why Nopco DD, recent product of Nopco research, is almost certainly superior to the lubricant you are now using for dry drawing steel wire—including galvanized or plated wire?

Chiefly, because it excels all other lubricants in these 3 ways:

1. **DD's specially processed calcium stearate base aids in surface tension—makes the soap stick to the wire all the way through the drawing process.**

2. **DD's soft film of combined coating and soap effectively separates wire and die—as compared to harsher soaps which have an abrasive action on the die.**

3. **Perhaps most important of all, because the melting point of DD is over 250°C. It does not "burn out" and lose effectiveness like other low melting point soaps often used.**

Though Nopco DD has been available only a year, plant after plant has adopted it—strictly as a result of its performance in their own comparative tests. Isn't it high time *you* tried it? We'll gladly help by furnishing full information and samples for testing. Write today.

NOPCO DD

for dry drawing steel wire

PRODUCT DESCRIPTION

A specially processed, high melting point, modified fused calcium stearate type lubricant.

Appearance	—White powder
Moisture	—Less than 1%
Melting Point	—More than 250°C

USES

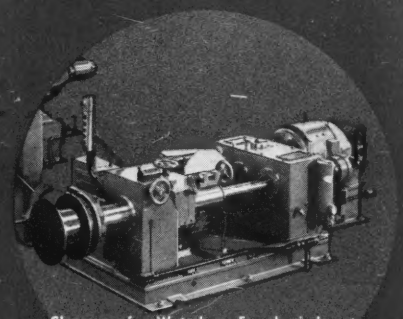
Type Wire	—High and low carbon steel
Size of Wire	—Rods to 16 gauge
Speed of Draw	—1500 to 2500 ft. per minute, and faster
Number of Dies	—Two to seven dies

NOPCO CHEMICAL COMPANY
Harrison, New Jersey
Cedartown, Ga. • Richmond, Calif.

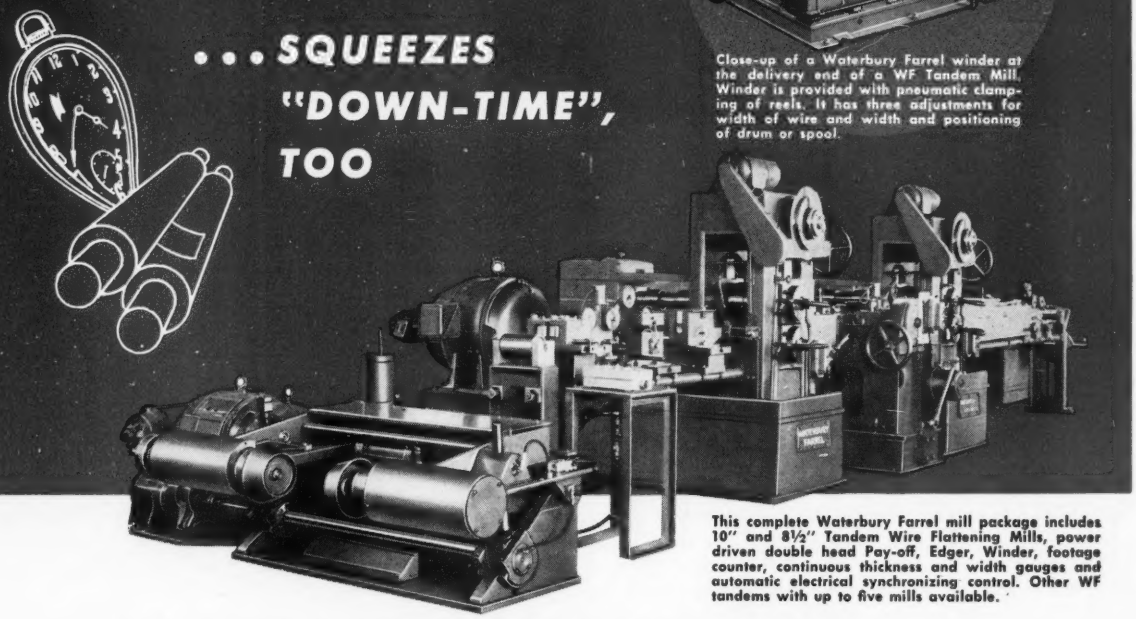
NOPCO TRADEMARK EVOLVED THRU RESEARCH

THIS WF WIRE FLATTENING TEAM

. . . SQUEEZES "DOWN-TIME", TOO



Close-up of a Waterbury Farrel winder at the delivery end of a WF Tandem Mill. Winder is provided with pneumatic clamping of reels. It has three adjustments for width of wire and width and positioning of drum or spool.



This complete Waterbury Farrel mill package includes 10" and 8½" Tandem Wire Flattening Mills, power driven double head Pay-off, Edger, Winder, footage counter, continuous thickness and width gauges and automatic electrical synchronizing control. Other WF tandems with up to five mills available.

Modern Waterbury Farrel Mill Design Insures High Production Plus Precision . . . Minimizes "Down-Time"

Here are some reasons why Waterbury Farrel Wire Flattening equipment can give you *more continuous*, high speed, precision production.

- Loading payoff and motor driven screwdowns for mills and edgers facilitate threading of wire with minimum effort and time.
- To protect precision operation, soluble oil is circulated internally and externally on the rolls and into coolant enclosures where wire is submerged. A refrigeration system maintains the coolant oil temperature at approximately 70° while a flotation unit keeps it clean and fresh. In addition, high speed mills also have a self-contained, automatically-filtered circulating mineral oil lubrication system for roll necks and drives.
- Transparent lucite covers at vital lubrication points such as gear cases and universal joints make it easy to check lubrication at a glance.
- Anti-friction bearings are used for all rotating members including the winder shaft. High precision anti-friction bearings are used on roll necks and edger arbors. This, combined with precision fitting of component parts enables WF mills to maintain tolerances well inside commercial allowance.
- Tungsten carbide ring rolls permit rolling the toughest alloys and increase roll life.
- Electric control keeps wire tension constant. Dancer rolls are used for fine wire.

Waterbury Farrel designs and builds a wide range of wire flattening mill equipment to suit specific requirements. Various sizes and combinations of single and multiple mill stands with auxiliary equipment are available for flattening ferrous and non-ferrous wire from the smallest diameters to 1" diameter and more. Speeds range up to and above 2500 FPM.

Write for further information.

WATERBURY FARREL FOUNDRY & MACHINE CO.
WATERBURY 20, CONN.
***Sales Offices:* Chicago, Cleveland, Millburn, N. J.**

WATERBURY FARREL FOUNDED 1851

A FEW OF THE MANY TYPES OF METAL WORKING MACHINERY MADE BY WATERBURY FARREL

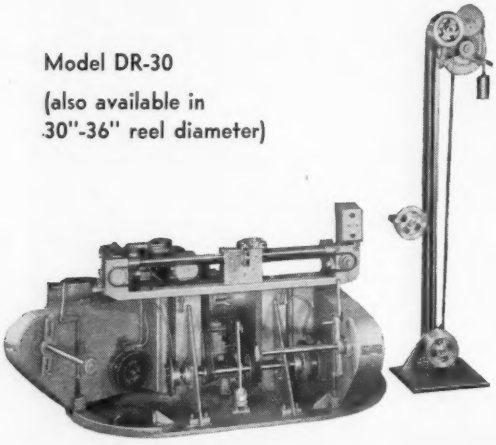
MILL MACHINERY—Rolling Mills: Strip, Rod, Wire Flattening, (For Ferrous and Non Ferrous Metals) • Also Slitters • Straighteners • Cut-off Saws • Coilers • Winders, etc. *WIRE MILL EQUIPMENT*—Continuous Wire Drawing Machines (Upright Cone and Tandem) • Wire Flattening Mills • Chain Draw Benches • Pointers Swagers • Bull Blocks • String-up Machines • Spoolers, etc. *COLD PROCESS BOLT & NUT MACHINERY*—Headers (all types) • Rivet Machinery • Trimmers • Thread Rolling Machines • Slotters • Nut Formers and Tappers, etc. *POWER PRESSES*—Crank, Cam and Toggle; also Rack and Pinion Presses • Eyelet Machines Multiple Plunger Presses • Horizontal and Hydraulic Presses, etc.

WF-5

4 New Davis Partners

Enjoy exclusive features

Model DR-30
(also available in
30"-36" reel diameter)



SEMI-AUTOMATIC DUAL REEL TAKE-UP

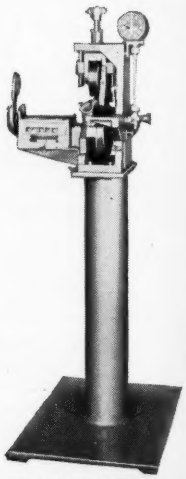
For use with your extruder for continuous wire insulating. 24"-30" diameter reels. 1¼"-1½" standard shafts. Maximum reel width 16".

- QUICK TRAVERSE TRANSFER—Push button-operated, the traverse transfers the wire quickly from full to empty reel. After it is transferred a solenoid-operated cutter snips the wire. The operator needs only to slide the fully wound reel off the driving shaft and replace it with another empty reel. The traverse mechanism is infinitely adjustable for wire lay and reel widths.
- PERMITS SPEEDS BEST SUITED TO YOUR NEEDS—To afford you greater control over the quality of your product, Davis engineering makes possible high and low operating speeds.
- STOPS WIRE DAMAGE AND BREAKAGE—To avoid wire damage or breakage, the dancer roll assembly is equipped with an automatic rheostat that reduces reel speed as the wire "builds up." Equipped with aluminum hardened sheaves for long wear. Uniform tension is controlled by adding weights to dancer roll.
- MINIMUM MAINTENANCE—Reel drive with silent chain is totally enclosed in oil. Unique design of machine employs heavy duty electric clutches that engage and disengage reel drives . . . instantly, positively. Equipped with electric brake. Mounted on a steel bed plate and fabricated of heavy duty welded steel, the Davis Dual Reel Take-Up is completely engineered and machined for proper alignment to insure minimum vibration and wear.
- SIMPLE TO INSTALL—Variable speed electronic drive, with 4-speed transmission and control station, is completely wired and mounted to the unit. Merely connect to power line and begin operations. Compact unit occupies a minimum of floor space.

WIRE AND CABLE MEASURING MACHINE

Predetermined or standard high speed counter with Quick Lever Reset handle; can be supplied with totalizers.

- PERMITS GREATER FLEXIBILITY IN YOUR WIRE HANDLING of covered or bare wire up to 1" diameter. Left or right hand assembly, for either direction of travel. Optional Tachometer to indicate wire speed in feet per minute can be provided.
- MEASURES ACCURATELY—It measures from the lower 18-inch circumference wheels to assure greater accuracy. A brake stops the measuring wheel the instant the wire leaves the machine.
- BUILT FOR LONG LIFE—Ruggedly constructed throughout. The measuring wheels are of hardened steel. To reduce friction and wear, roller bearings are used in upper and lower measuring wheels.
- COMBINES EASE WITH SPEED—There is a lift and lock on the top wheel to hold the wheel off the wire during set-up operations. The completely open side makes it possible to feed the machine without going through the guide bushings. Operates at speeds up to 2,000 feet per minute.
- OPTIONAL EQUIPMENT AVAILABLE AT LOW COST—Models that subtract . . . Guide Bushings . . . Wax Scraper . . . Light Signals . . . Can be equipped to record fractional feet, yards, meters.



Model L-DD

Davis ELECTRIC CO.

WALLINGFORD, CONN., U.S.A.

HARNESS TESTERS ★ PAY-OFFS ★ TRAVERSES

SPARK TESTERS ★ SPOOLERS ★ TAKE-UPS ★ CAPSTANS

Correspondents throughout the world

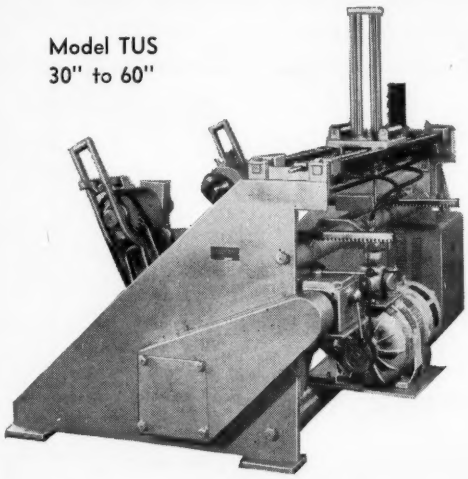
Foreign Sales Representatives: OMNI PRODUCTS CORP. 460—4th Avenue, New York 16, New York

DAVIS
WIRE & CABLE EQUIPMENT

for Higher Quality Production

available only in DAVIS Wire & Cable Machinery

Model TUS
30" to 60"



HEAVY DUTY SHAFTLESS TAKE-UP

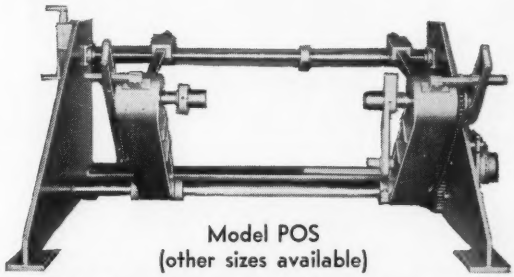
For insulated wire and cable.

- EASY TO INSTALL—Infinitely variable-speed, Electronic drive and control station are completely mounted on the unit. Just connect to power line . . . it's ready to operate!
- SILENT-RUNNING—Reel drives are heavy roller and silent chain. Motor drives are belted, with 8-speed transmission.
- COMPLETELY ADJUSTABLE—Traverse mechanism is infinitely adjustable for wire and cable diameter.
- TAILORED TO YOUR NEEDS—Wire speeds and tension are fitted to your specifications. All other specifications of the Pay-Off, except drag brake, also apply to the Take-Up.

HEAVY DUTY SHAFTLESS PAY-OFF

For reels with outside diameter 30"-60"—adjustable width. For insulated wire and cable.

- MACHINE DOES THE LIFTING—Mechanical positive lift, manually operated, easily raises and lowers reels off the floor to loading or unloading position. It shaves costs and speeds production by eliminating the need for cranes or hoists. Reel width adjustment controlled by handwheel.



Model POS
(other sizes available)

- SHAFTLESS DESIGN CUTS ACCIDENTS—The need for reel shafts is eliminated; therefore, operator injuries from handling shafts are ended. Too, chances of accidents are cut because fewer motions are necessary to get the reel into position.
- STEPS UP PRODUCTION—Save time handling reels. Quick-change pintles readily fit reel arbor holes. The driving dog is adjustable to all reel driving holes. Reel pintles are mounted on ball bearings. Hand lever with self-locking device moves pintles to engage and disengage arbor holes. These features result in a smooth, continuous flow of work. No time is lost in changing reels. Supplied with free-running, or adjustable, electrical drag brake.
- LOW COST MAINTENANCE—No hydraulic or pneumatic cylinders to be maintained. Heavy steel plate stand. Reel arms are cast for high tensile strength. Both reel lift arms are mounted on rugged 3" steel shaft and supported by plate steel frame.

★ ★ ★

Wire and cable production of the highest quality is achieved with these four new Davis Electric Company machines. Their simple design and rugged construction keep maintenance to a minimum and make them safe and easy to operate. The adaptability of these units cuts costs as well as speeds up production. All these machines are easily installed.

The combination of the Davis Wire Measuring machine, Spark Tester, and Shaftless Pay-Off and Take-Up, make the ideal automatic re-reeling and spark-testing unit.

Mail **this coupon** for complete information on the machines you are interested in.

DAVIS ELECTRIC CO.
Wallingford, Conn.

Dear Sirs:

Please rush me complete information on the machines checked below:

( ) New Wire and Cable Measuring Machine
( ) New Heavy Duty Shaftless Take-Up
( ) New Heavy Duty Shaftless Pay-Off
( ) New Semi-Automatic Dual Reel Take-Up

List others here .....

Name ..... Title .....

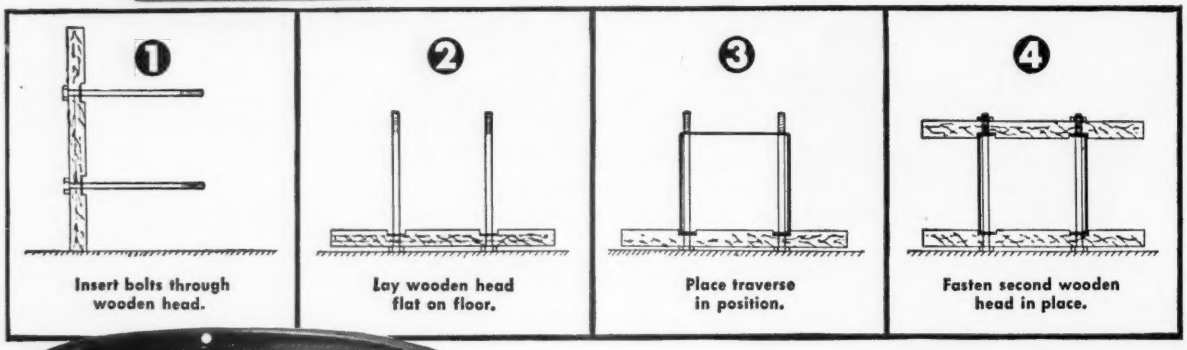
Company .....

Address .....

City ..... State .....

SAVE

TIME · LABOR · SPACE · MONEY through this simple 4-STEP ASSEMBLY of Republic Flanged Steel Traverses



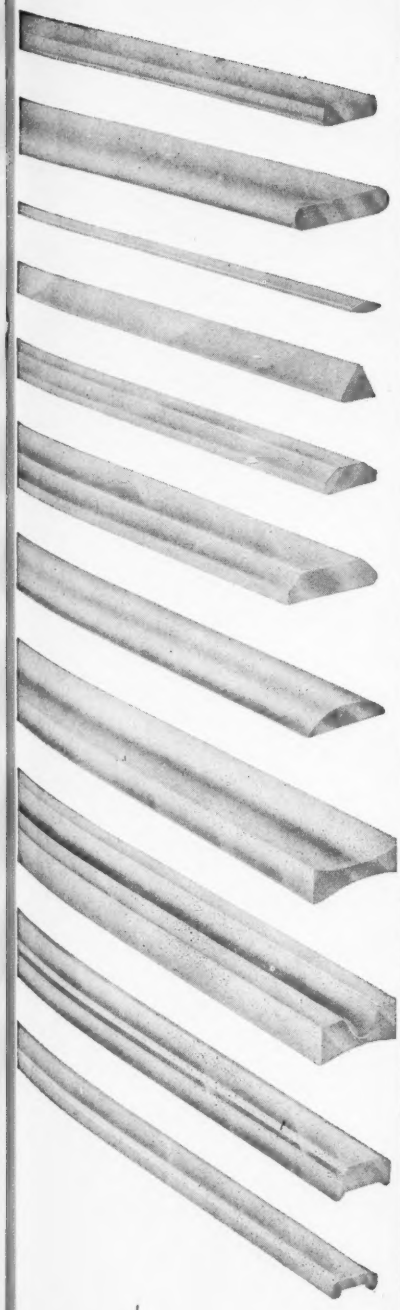
Republic Flanged Steel Traverses save time . . . because they require only four simple steps in reel assembly. They save labor . . . no special tools are necessary. They may be stacked and stored in a minimum amount of room . . . thus saving space. And they save money by providing long service life. Actual experience records show that Republic Flanged Steel Traverses have given as much as sixteen years' service—without refinishing or major maintenance. In many cases, their use has doubled the number of trips per reel before cut downs or scrapping of wooden heads.

Republic "Reinforced Type" Steel Traverses have extra strength where it is needed most—at bolt holes and base of flange. Reinforcing makes possible the use of lighter gauge steel, saving up to 20% in weight while increasing over-all length.

Sizes of Republic Flanged Steel Traverses range up to 56″ diameter and 48″ traverse. Finishes include plain, painted and hot dip galvanized. Width of flange and number of bolt and drain holes can be furnished to your specifications. Write today for prices.

REPUBLIC STEEL CORPORATION
Pressed Steel Division, 465 Walnut St., Niles, O.
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

REPUBLIC
FLANGED STEEL TRAVERSES



NATIONAL WIRE

(COLD ROLLED)

in Coils or Straight Lengths

COMPLETE METALLURGICAL SERVICE

Manufacturers of

SPRING WASHERS	RETAINING RINGS
ROUND EDGE FLAT WIRE	KEYSTONE SHAPED WIRE
SQUARE EDGE FLAT WIRE	SPECIAL SHAPED WIRE

Shaped Wire in Coils or Straight Lengths, Ferrous or Non-Ferrous.

LARGE OR SMALL QUANTITIES

Manufactured by

THE NATIONAL LOCK WASHER COMPANY

PRECISION SHAPED WIRE DIVISION

NEWARK 5, N. J. MILWAUKEE 2, WIS. U.S.A.

What our customers ORDER from us is brass, bronze, copper, nickel-silver, and other non-ferrous alloys in wire and strip. What they expect, and GET, is something additional and quite as important. Our customers most appreciate VOLCO's personalized service, painstaking care, uniformly high standards, and ability to fill the most exacting requirements.

High among our valued facilities for supplying BOTH material and red-tape-less, man-to-man methods is the east-west string of branches we have set up to render quick, convenient service to any location from the Atlantic to the Mississippi.

VOLCO **BRASS and COPPER COMPANY** B&VC

WIRE
ROD
SHEET
BRASS • COPPER • BRONZE • NICKEL SILVER

Mills and Sales Office: KENILWORTH, N. J. • N. Y. Phone: WORTH 2-7500

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66 YEAR OLD MORGAN

extends *Silver Anniversary Greetings*

to **THE WIRE ASSOCIATION**

NEW!

THE MORGAN DEAD BLOCK

for non-stop wire drawing

- *fast*
- *safe*
- *large coils*

Morgan Construction Company • **WORCESTER, MASS.**

Low Power Cost •

MORGAN-CONNOR

WIRE

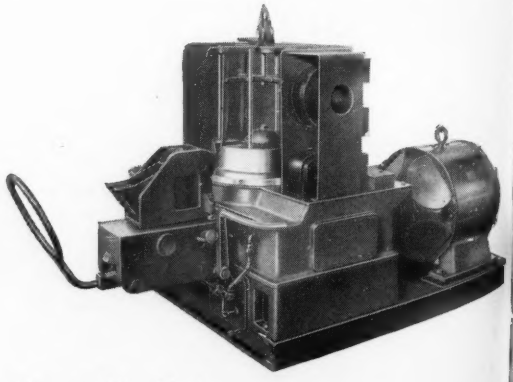
These are the benefits you want most from a wire machine:

Low Power Cost

Less power is required to operate one motor than several smaller ones. Morgan-Connors operate on a single motor of the right capacity to make the most efficient use of power.

Low Die Cost

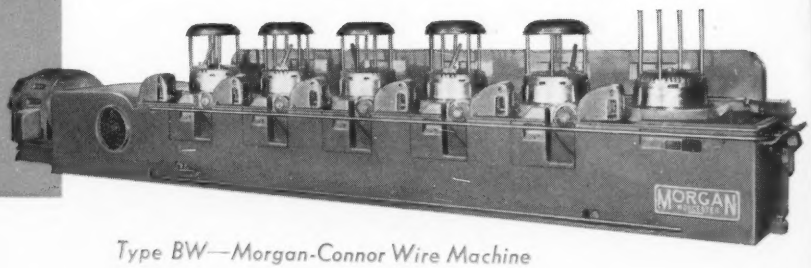
Morgan-Connor air cooling inside and outside the coil effectively preserves the wire coating and maintains lubrication—thereby increasing the life of the dies.



Morgan Wire Block

Low Die Cost · Low Space Requirement · High Production

AN



Type BW—Morgan-Connor Wire Machine

MACHINES

Low Space Requirement

Compactness coupled with convenient and safe operation are major objectives of Morgan-Connor engineers. The fact that Morgan-Connors are used extensively by the world's largest producers is proof of the success of our designs.

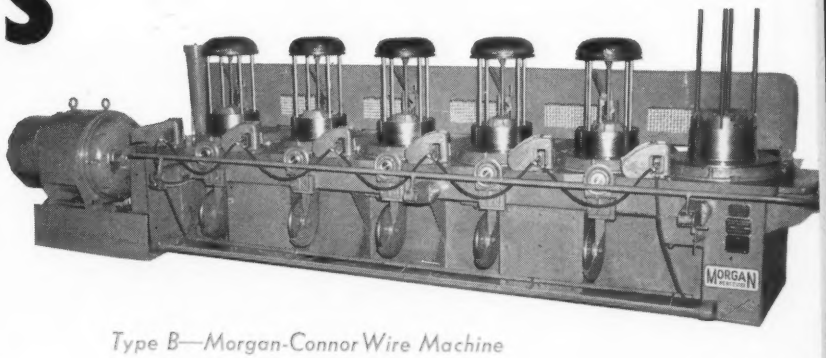
High Production

Sound basic design, sturdy construction, no-slip operation, flexibility in drafting and air cooling permit fast, continuous drawing.

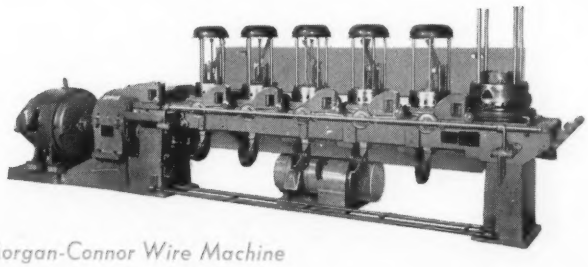
Let us tell you more of the benefits of using Morgan-Connor Wire Machines.

MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS

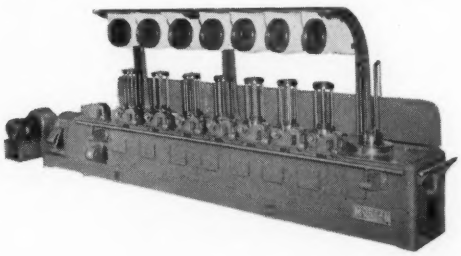
WM-70



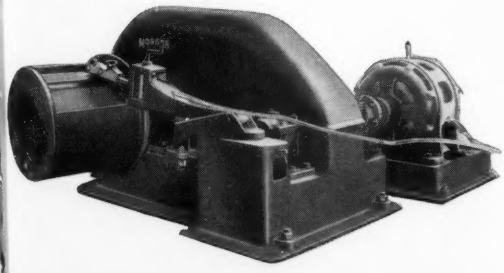
Type B—Morgan-Connor Wire Machine



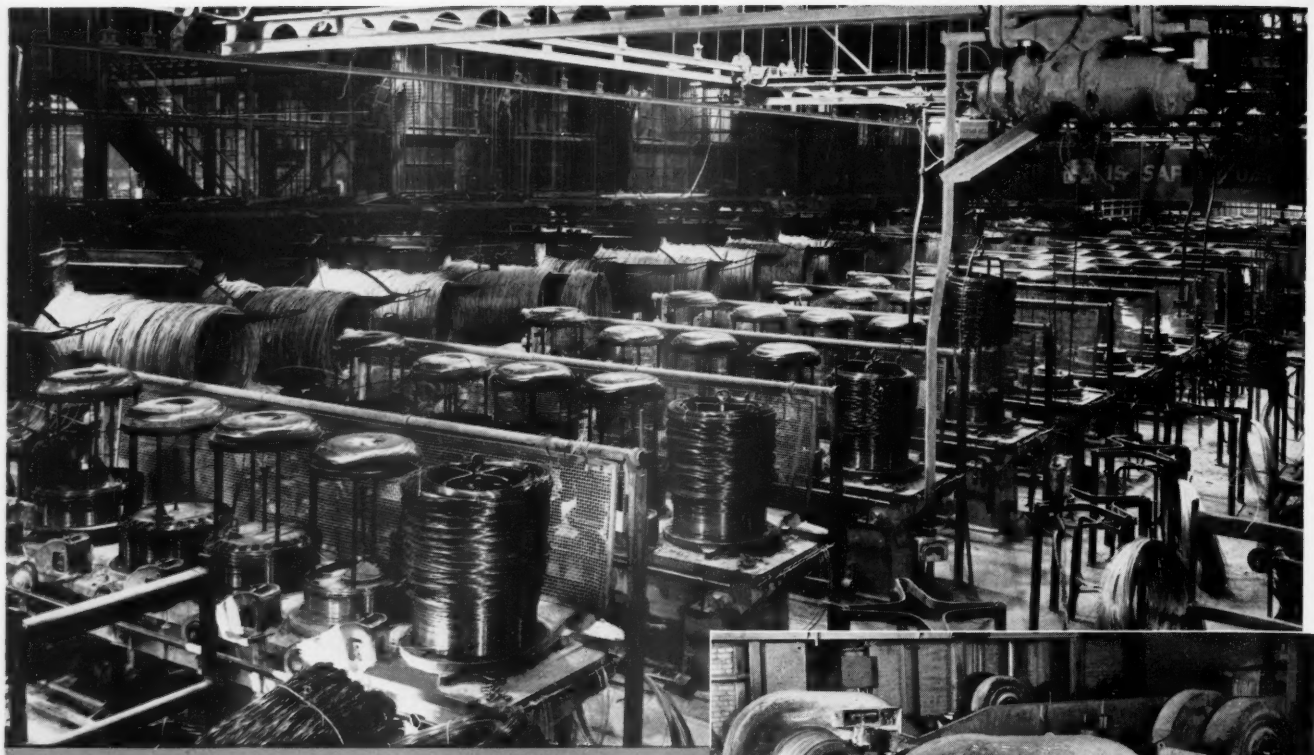
Type C—Morgan-Connor Wire Machine



Type F—Morgan-Connor Wire Machine



Morgan Horizontal Bull Block



MORGAN-CONNOR WIRE MACHINES

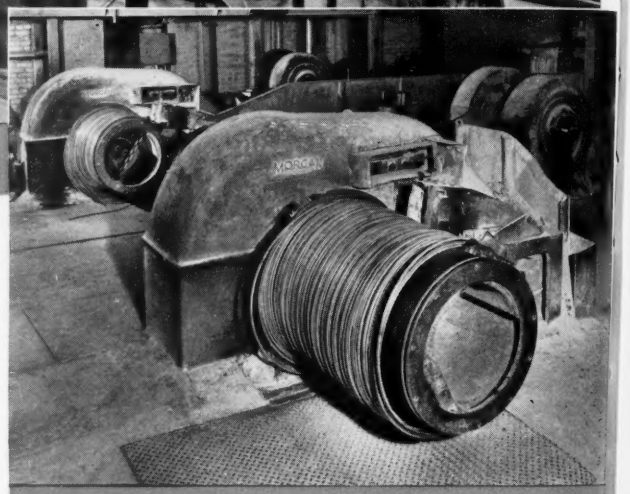
This is typical of hundreds of Morgan installations. The first Morgan-Connor machines were installed in the plant of this leading Wire Manufacturer about 25 years ago. New machines have been added periodically to take care of steady growth.

There's a Morgan-Connor machine made to fit almost any set of requirements. Let's start with the basic planning.

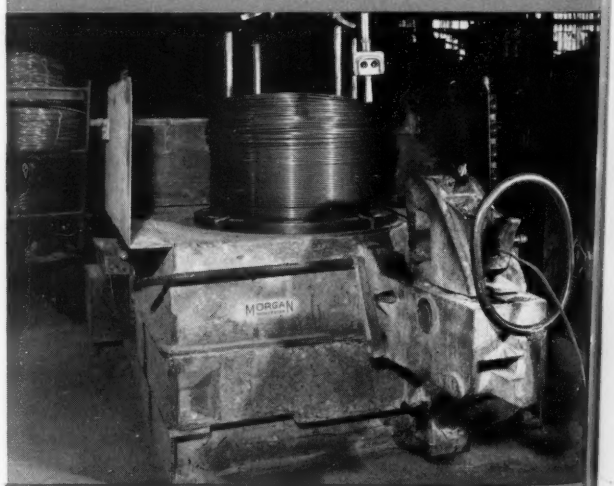
•

Morgan Construction Company

WORCESTER, MASSACHUSETTS



MORGAN HORIZONTAL BULL BLOCK



MORGAN WIRE BLOCK

JOHNSON *Specialty Wires*

Offices and Warehouses

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Phone: ORegon 9-2440
Teletype: NY 1-2171

PHILADELPHIA (3)
SUBURBAN STATION BLDG.
Phone: Locust 7-7380
Teletype: PH-495

AKRON (10) *Branch Plant*
560 HOGUE AVENUE
Phone: Hemlock 4174
Teletype: AK-35

DETROIT (2)
FISHER BUILDING
Phone: Trinity 1-1300
Teletype: DE-323

PITTSBURGH (30)
GRANT BUILDING
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Teletype: PG-575

CLEVELAND (14)
UNION COMMERCE BLDG.
Phone: Cherry 1-2991
Teletype: CV-351

DAYTON (2)
REALTY BUILDING
Phone: Adams 4161
Teletype: Dayton 181

CHICAGO (8) *Warehouse*
1500 SOUTHWESTERN AVE.
Phone: Monroe 6-3658
Teletype: CG-1419

CHICAGO (4)
District Sales Office
McCORMICK BLDG.
Phone: Wabash 6550
Teletype: CG-1344

LOS ANGELES (59)
Plant and Warehouse
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Phone: Loraine 6-0194
Teletype: LA-334

LOS ANGELES (17)
District Sales Office
STATLER CENTER
Phone: Madison 1456
Teletype: LA-725

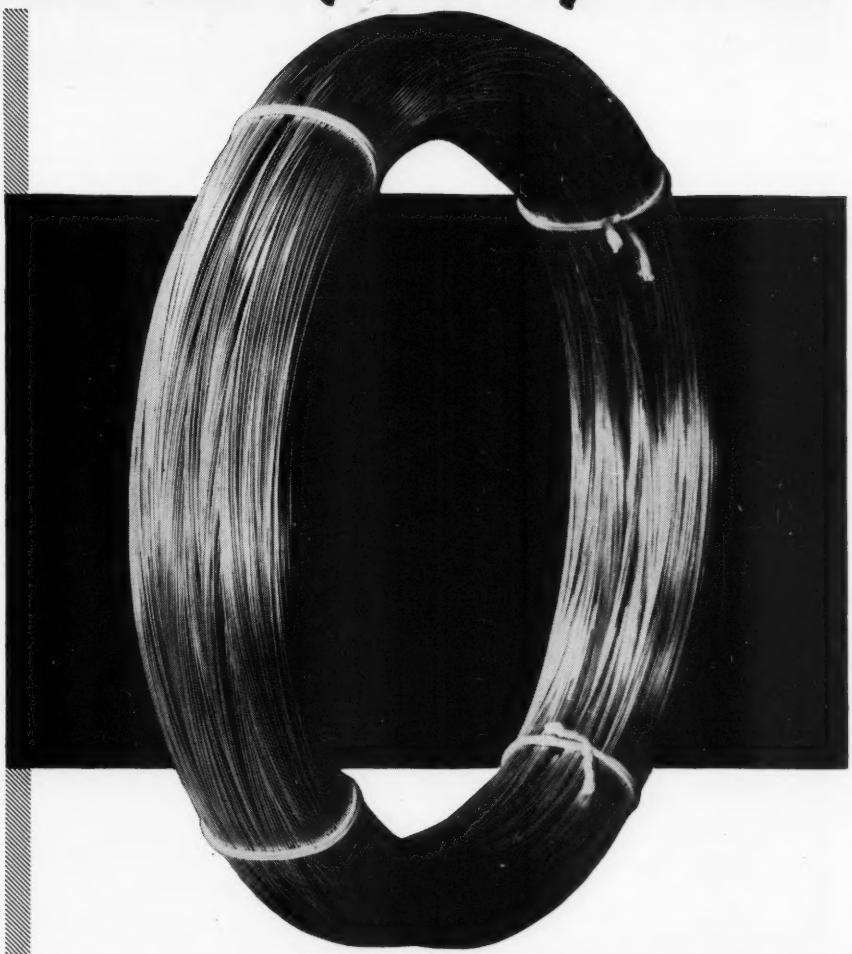
HOUSTON (2)
SECOND NATIONAL BANK BLDG.
Phone: Blackstone 6635
Teletype: HO-372

TULSA (3)
PHILTOWER BUILDING
Phone: Tulsa 24396
Teletype: TU-97

ATLANTA
1725 PEACHTREE ST., NORTHWEST
Phone: Cypress 5858
Teletype: AT-570

In Canada

TORONTO 2B, ONTARIO
BOHNE INDUSTRIES, LTD.
1149-53 Queen Street West
Phone: Lakeside 4418



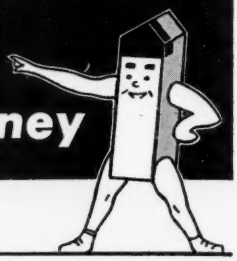
Aircraft Cord Wire • Bobby Pin Wire — Flat, Half Round, Round • Brush Wires — Round or Flat, Tempered and Untempered • Card Wire • Flexible Shaft Wire • Hose Reinforcement Wire • Mechanical Hose Wire • Metal Stitching Wire • Music Spring Wire • Rope Wire • Stapling Wire • Tempered and Untempered MB Spring Wires • Tire Bead Wire • Vacuum and Defroster Hose Wire • Tempered and Untempered Flat or Shaped Wire. Other High Carbon Specialty Wires.

FINISHES: Bright • Liquor Finish • Copper Coated • Bronze Plated • Galvanized • Tinned Coated • Alloy Coated.

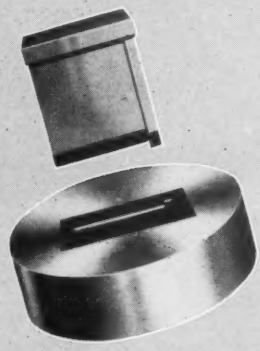
Coils • Spools • Spoolless Cores • Straightened and Cut.

JOHNSON STEEL AND WIRE COMPANY, INC.
WORCESTER 1, MASS.
A Subsidiary of Pittsburgh Steel Company

Production Records Prove *Talide Dies* Save You Money

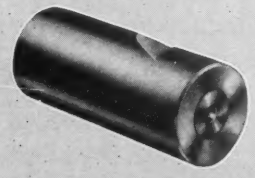


● 137,000 hi-alloy steel Pressure Vessels deep drawn through a TALIDE Sheet Metal Die—with buffing and polishing costs cut 80%—downtime 98%—and scrap 100%. Best production from steel die used previously was 7,900 cylinders before wearing oversize.



BLANKING AND FORMING DIES

Over 5,000,000 abrasive paper discs blanked out with a TALIDE Blanking Die—70 times more than produced with hard alloy dies used previously.

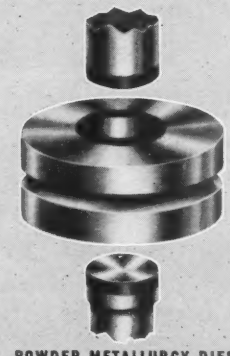


HEADING AND EXTRUSION DIES

Costly cold-heading job on 3/4" carriage bolts producing only 50,000 pcs. per steel die made profitable with average 1,500,000 piece production runs with TALIDE Cold-Heading Dies.

CURLING ROLLERS

Large Can Company reports TALIDE Curling Rolls last 65 times longer than steel rolls on beverage can forming operation—with edges free from burrs and cracks.

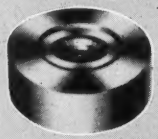


POWDER METALLURGY DIES

Large Pharmaceutical Company reports TALIDE Pill Dies not only produce tablets having a superior surface glaze which reduces rejects 82%—but also outlasts steel dies 100 to 1.

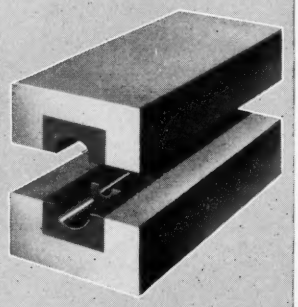
TUBE MANDRELS

12 days (36 shifts) of continuous trouble-free production obtained by eastern Brass Mill with TALIDE Tube Drawing Mandrels—compared to average 8-hr. runs obtained with steel mandrels.



DRAWING DIES

50 miles of tough 5" alloy steel tubing (actually 252,000 ft.) drawn by large midwestern Steel Mill through TALIDE Tube Die compared with a normal run of 10,000 ft. with a steel die.



SWAGING DIES

Leading Fountain Pen Manufacturer cold swages an average of 750,000 stainless steel sleeves with TALIDE Swaging Dies—33 times more than with chrome-plated dies.

● Available in size range from .010 to 24" I.D. and in any shape, Talide Dies meet every requirement. Uniform quality and consistent performance are assured by 21 grueling tests including physical, chemical and metallographic. Send us prints or parts of your particular die application for estimate and recommendations. **Metal Carbides Corp., Youngstown 7, Ohio.**

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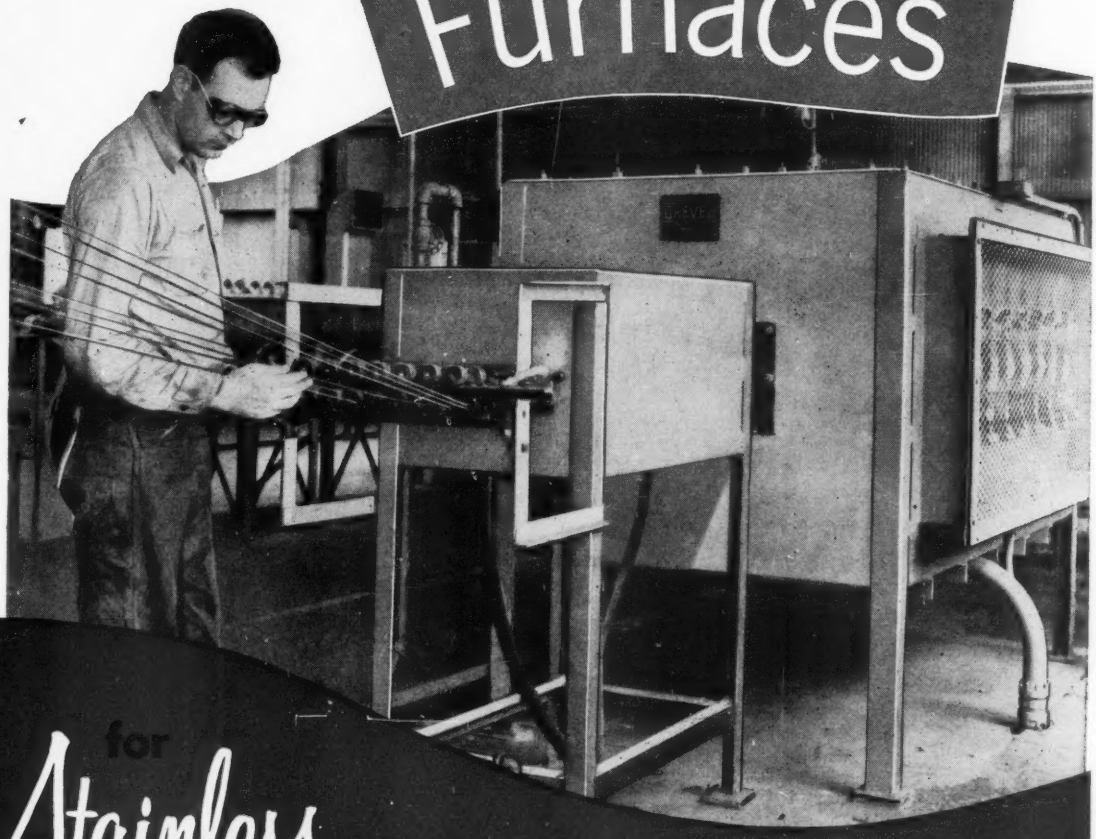
Wire Annealing Furnaces



for Stainless

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Call on our staff of experienced furnace engineers to discuss your wire heat treating problems

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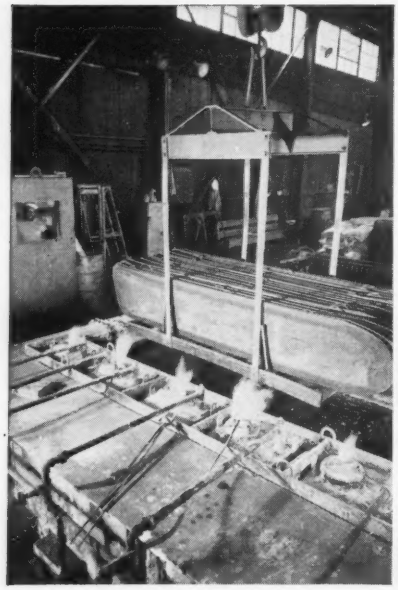
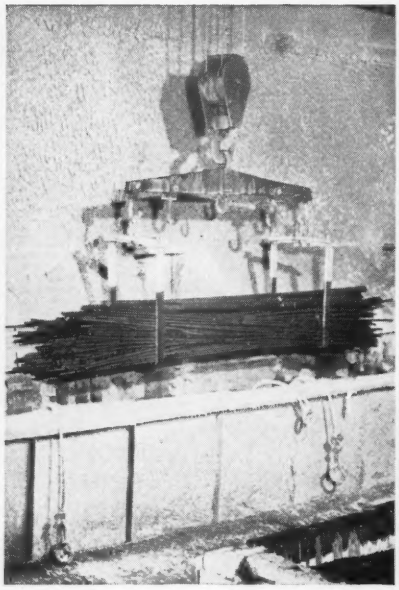
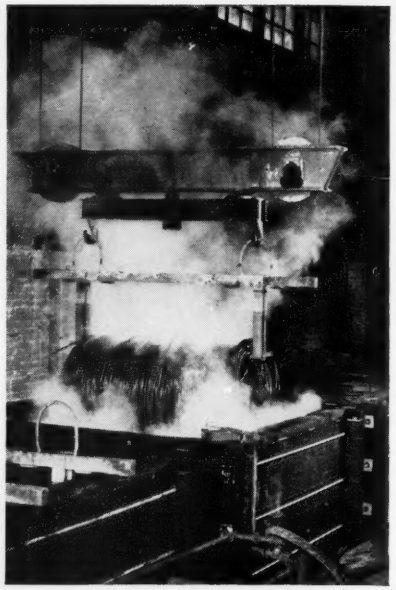


TOOL STEEL SHEETS



STAINLESS STEEL BAR STOCK



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You can safely descale most metals in 20 minutes or less

WITH THE DU PONT SODIUM HYDRIDE PROCESS

In 10 to 20 minutes, sheets, bars, wire, rods, forgings and fabricated articles are completely descaled with the Du Pont Sodium Hydride Descaling Process. Even heavily scaled forgings (½" scale thickness) take less than an hour. And in only 15 seconds you can get cold reduced-annealed strip clean and bright!

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TECHNICAL SERVICE AVAILABLE

If you are descaling metals which are unaffected by fused caustic at 700°F., it will be to your advantage to talk to us about the Du Pont Sodium Hydride Process. Du Pont pioneered this modern descaling method and can bring a depth of technical experience to bear on your descaling problems.

There's no cost for this service which includes laboratory investigation of problems, plus expert aid in construction, installation and operation of the process. Just call our nearest district office or send in coupon below.

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☐ Please have one of your technical men call. I am interested in descaling _____

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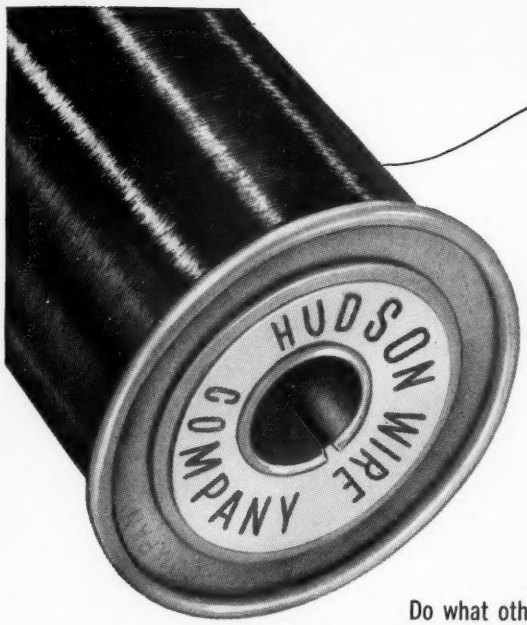

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made finer

Do what other electronic and electrical manufacturers have done for years: Turn your fine-wire problems and requirements over to Hudson Wire. You will be served promptly, satisfactorily, economically, by craftsmen backed by over 50 years of fine-wire specialization.

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Coppers	Tin
Brasses	Cadmium
Bronzes	Oxygen-free Copper
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Silver-plated Coppers, Brasses, Bronzes	Aluminum and Silver-Plated Tape for Voice Coils
Electro-tinned Copper	Flat-Wire Ribbons
Stranded and Bunched Silver-plated	

TEXTILE-COVERED WIRES

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Celanese	Rayon
Silk	Fiberglas

Available on bare or enameled wire, single- or double-coated

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MATERIALS	TYPES	COVERINGS
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Aluminum	Litz	Formvar
Iron	Multiple and Twisted	EZsol (Liquid Nylon)
Copper-clad Steel		Cement-coated Enamel
		Dow-Corning 1360 Silicone

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Keystone Steel & Wire Company - - - - - Peoria, Ill.
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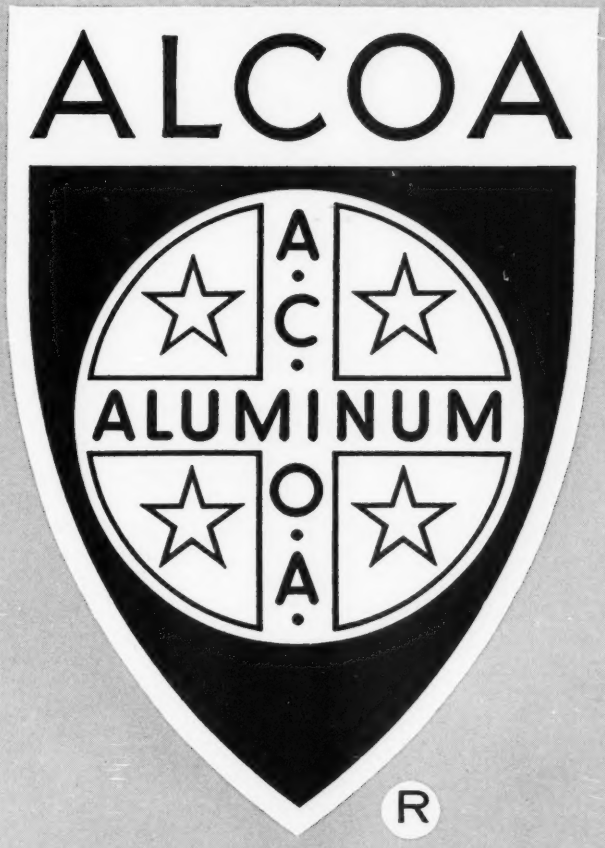
ALCOA ALUMINUM WIRE



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within a radius of 200 miles from the plant. Fast freight will bring you Bridge reels in 5 days or less east of the Mississippi.

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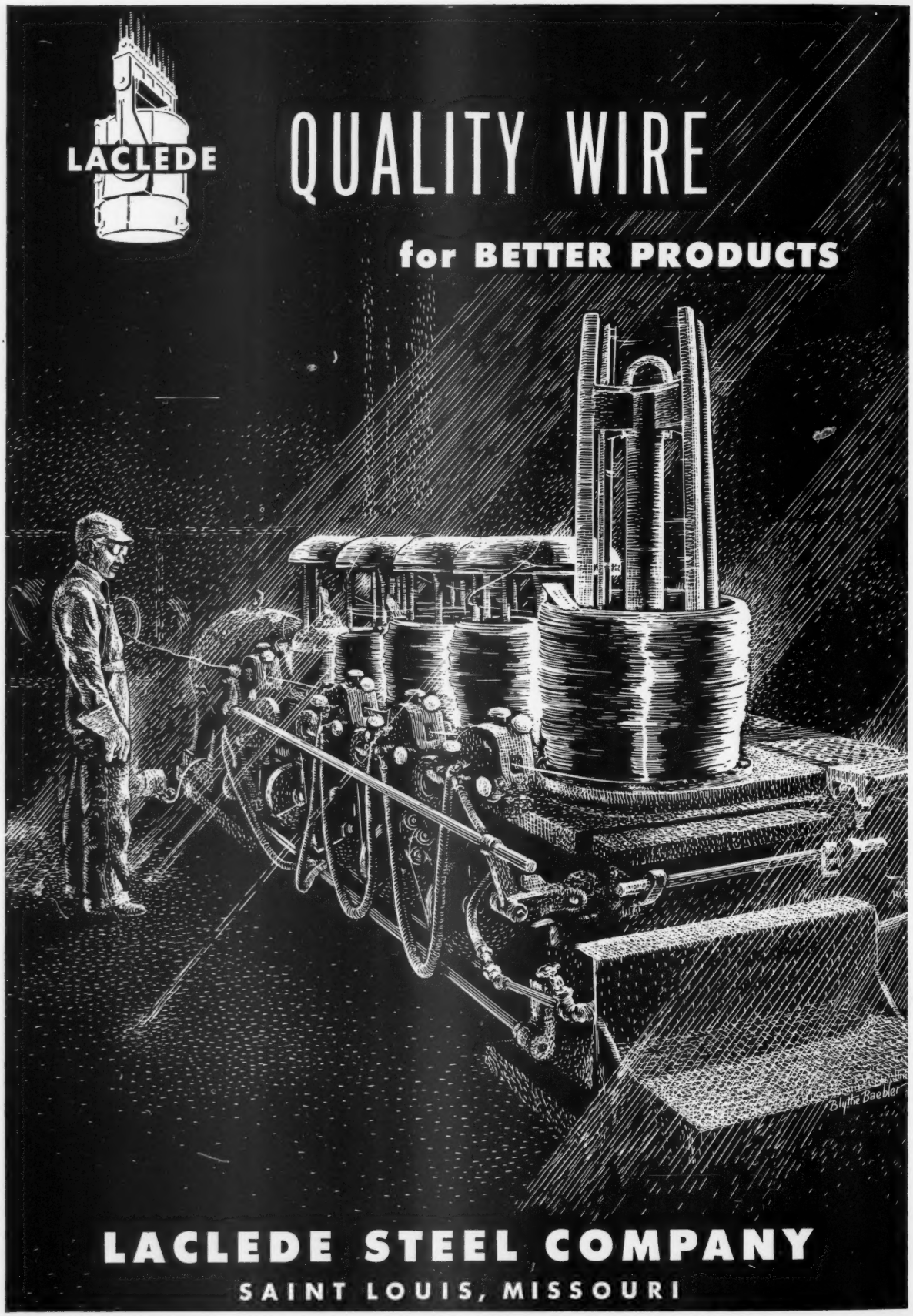
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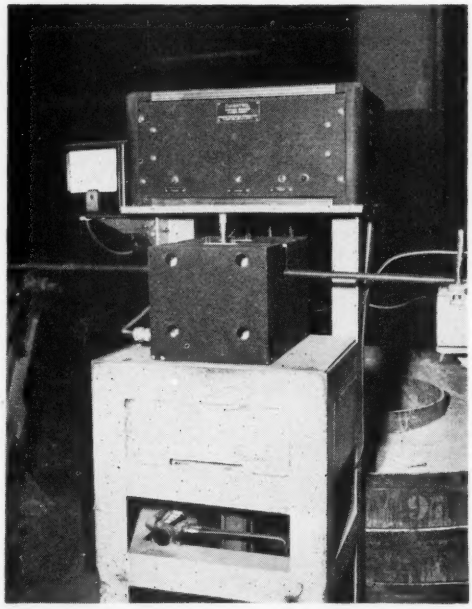

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With this Electron Micrometer and its unique no-drift circuits, you can automatically control the diameters of your cable, in-process

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Automatic inspection and control of the diameter of *extruded* materials easily accomplished with the SERC "DIAMACONTROL."

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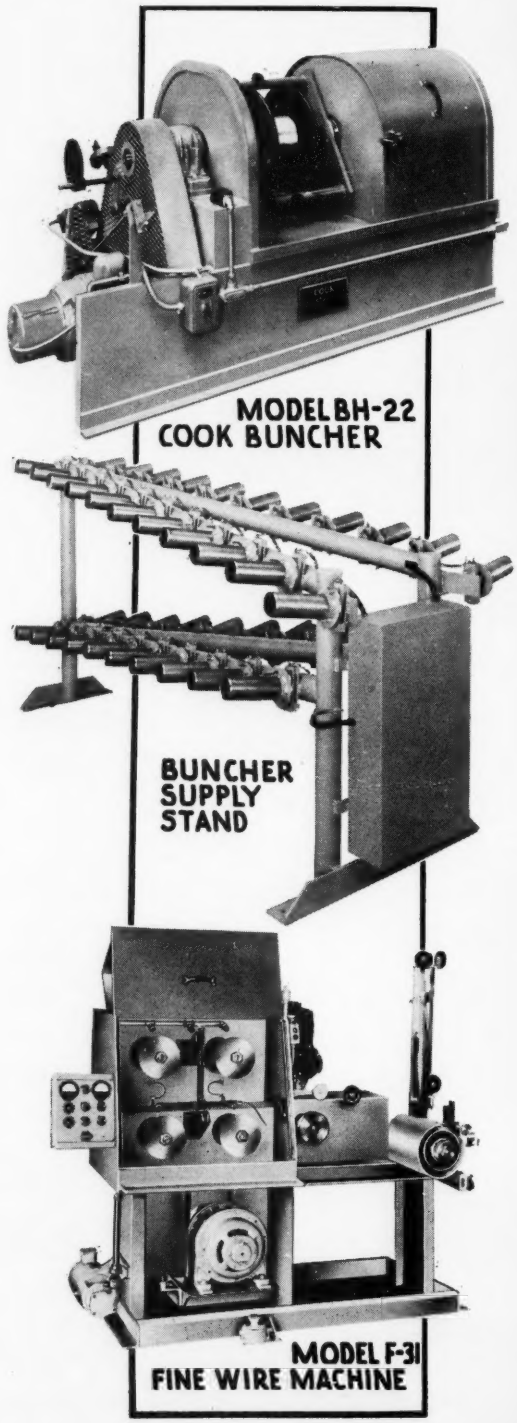

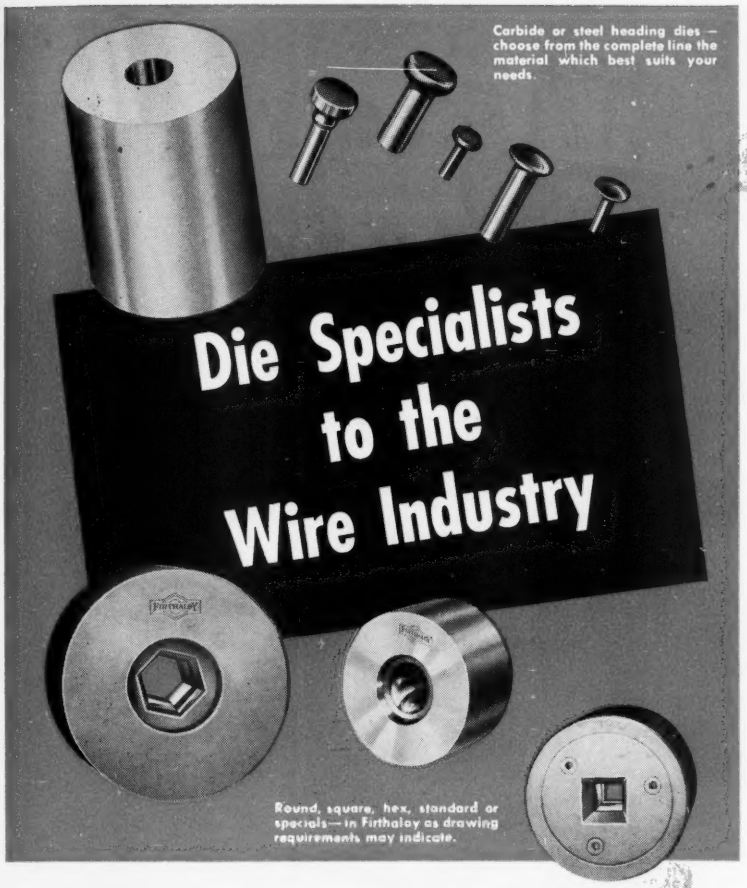
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Firth Sterling representatives are skilled in interpreting the needs of the wire industry and in suggesting the exactly right steel or carbide for specific applications. Because they know and sell both, you can depend on their unbiased recommendations to result in better, more economical tooling.

Attention: Fastener Industry! C.H.Q. Die Steel makes cold heading records

C.H.Q. solid die after 192,000 run.

A nationally known fastener manufacturer* recently made comparative tests of solid steel cold heading dies, under carefully controlled conditions, producing ⅝" square head machine bolts from 1020 steel on a Waterbury Farrel double stroke automatic.

Firth Sterling C.H.Q. came off with top honors and the highest production ever obtained by this manufacturer from any steel die . . . 192,045 both ends. (78,860 one end, 59 Rockwell C; 113,185 other end, 61 Rockwell C.) Standard competitive carbon steel dies produced only 50,000-60,000 both ends and ultimately failed by cracking axially. The C.H.Q. die wore oversize but longitudinally etched section revealed not even a hairline crack.

Ask for technical literature on C.H.Q.—or a Firth Sterling representative will discuss your die problems.

*(name on request)

R-299

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5 SLIDES, OR MORE...

MEYER, ROTH & PASTOR'S machines mass-produce these and many other parts.

- 5 different size machines for fully automatic, economical production of parts from wire coil or strip stock.
- Various sizes produce from 60 to 300 pieces per minute in wire up to .145" diameter or strips up to 25/32" wide.
- Simplified tooling—machine can be quickly re-set to produce different parts.
- Vertical design takes up little floor space.
- Positive and direct control of the bending slides insures high output and trouble-free operation.
- Roller straightening attachment (7 vertical and 7 horizontal rollers) can be opened—you can feed material without disturbing the roller setting.
- Special gripping device insures uniform feed and does not mark wires or strips.
- 3-speed drive.
- Standard equipment includes 4 forming and 1 punching slide and a complete set of tooling. Additional forming slides and attachments, including a blanking and punching attachment, can be supplied.

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COSA CORPORATION, 405 LEXINGTON AVENUE, NEW YORK 17, N.Y.

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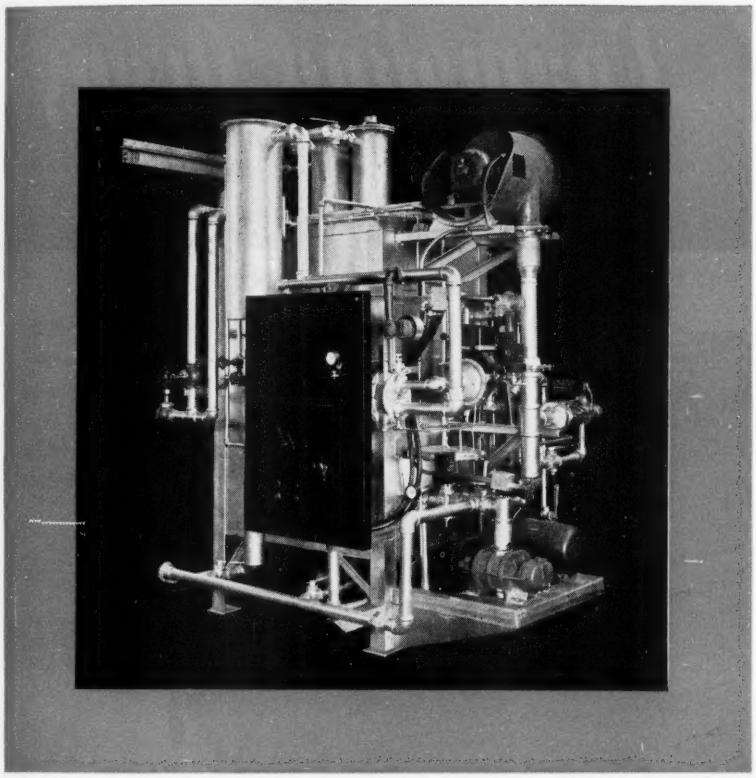


There's a fourth dimension in every atmosphere generator, which makes a significant difference in Heat Treat productivity and equipment earning power. It's the number of *previous successful applications* which, in the case of Surface generators, runs literally into thousands. Indeed, they go back to 1929, the year of the first use of a neutral atmosphere for controlling oxidation of non-ferrous metal. If you want the best guarantee that specifications will be met or exceeded, specify 'Surface.' The latest and most authoritative data on gas atmospheres are presented in our bulletin SC-155. We'll be glad to send you a copy.

***Specify* SURFACE COMBUSTION ATMOSPHERE GENERATORS**

POCKET-GUIDE

TO GAS ATMOSPHERES

FOR ALL REQUIREMENTS

GAS	CAPAC. c.f./hr.	APPLICATIONS
RX	250 to 5600	carburizing, dry cyaniding, brazing, sintering, bright annealing, clean hardening, carbon restoration (skin recovery)
DX LEAN	250 to 35,000	bright annealing and sintering (copper)
DX RICH	250 to 35,000	bright annealing, brazing (low and medium carbon steel)
NX	2500 to 20,000	bright annealing (copper, carbon steel), clean hardening (medium carbon steel)
HNX	5000 to 20,000	extra bright annealing (copper, low carbon steel), clean annealing (stainless steel)
AX	100 to 4000	rapid de-oxidation of surface metal, brazing, sintering (low carbon steel), bright annealing (stainless)
HX	1000 to 15,000	rapid de-oxidation of surface metal (low carbon steel), bright annealing (stainless)

This condensed table of Surface Combustion prepared atmospheres (designations are trademarked) shows at a glance how broad a range of heat treat requirements they meet. Specified gas compositions are accurately and economically maintained, over the entire range of capacities. Your nearby Surface representative can draw from an unequalled fund of industry-wide experience, and recommend equipment best suited to your job. Bulletin SC-155 presents 8 solid pages of valuable data.

Surface
HEAT TREATING EQUIPMENT

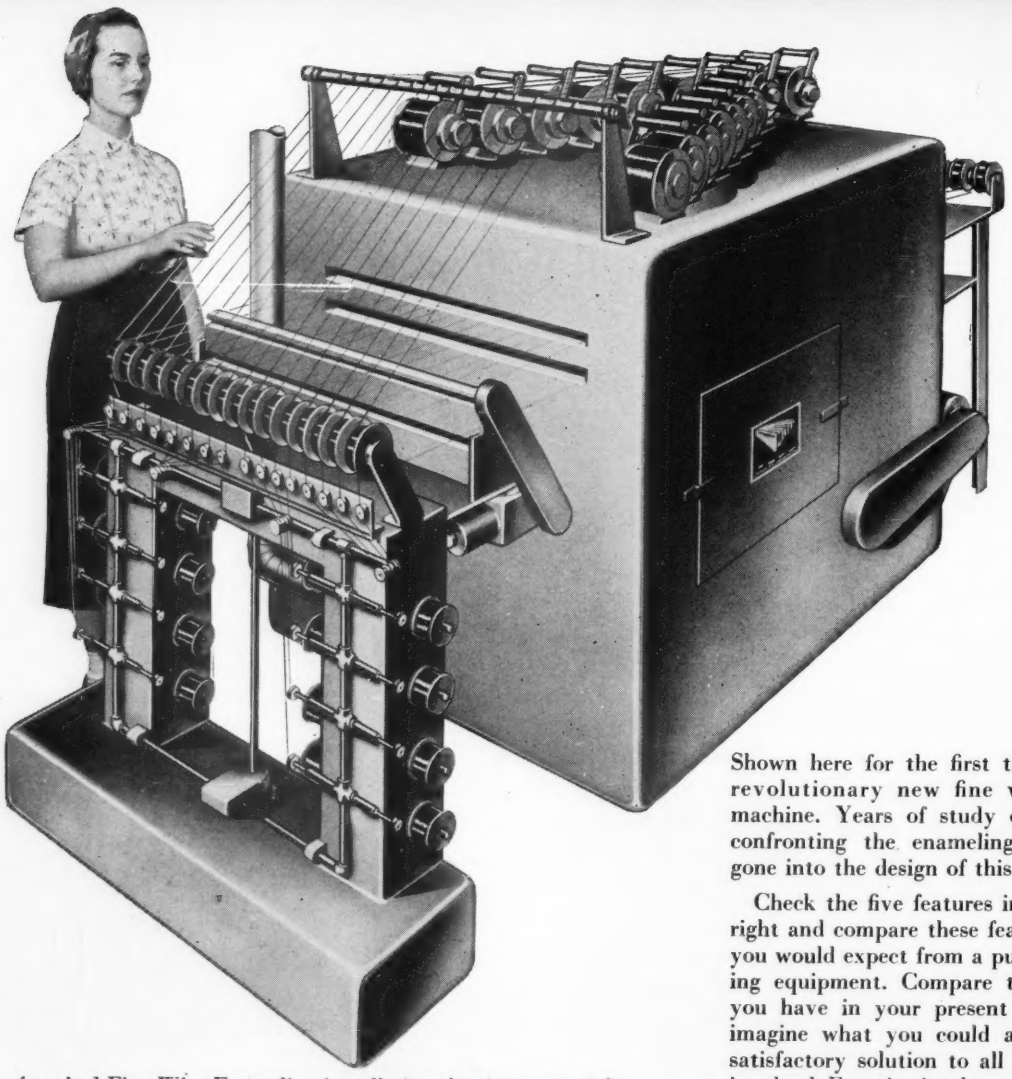
SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO

ALSO MAKERS OF

Kathabar HUMIDITY CONDITIONING Janitrol AUTOMATIC SPACE HEATING

HOW to step up your enameled wire production

a NEW Concept of Enameling Ovens



A typical Fine Wire Enameling installation showing some of the modern-design features which aid in increasing wire production.

Shown here for the first time is MOCO'S revolutionary new fine wire enameling machine. Years of study of the problems confronting the enameling industry have gone into the design of this equipment.

Check the five features in the box at the right and compare these features with what you would expect from a purchased enameling equipment. Compare them with what you have in your present equipment and imagine what you could accomplish by a satisfactory solution to all of the problems involved. Examine its clean, compact appearance. It will indicate just what you can expect from these new equipments.

..... by MOCO

5 EXCLUSIVE FEATURES OF MOCO ENAMELING MACHINES

1. **ECONOMY**—advanced design offers low fuel consumption—less maintenance costs. The original cost of this Enameling Oven has been cut to a minimum—also, a small floor space is required for installation.

2. **HIGH OUTPUT**—enameling speeds—with minimum wire breakage—have been raised to a new high.

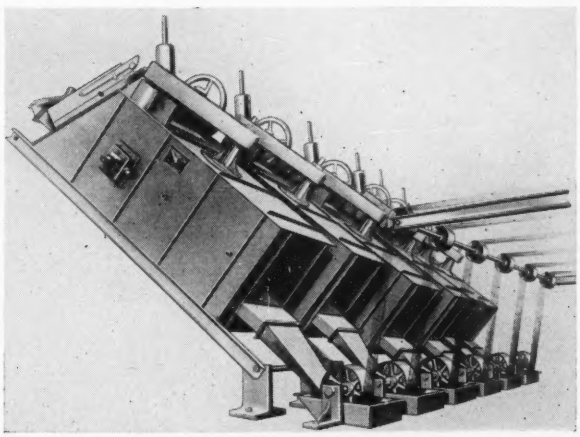
3. **VERSATILITY**—a wide range of insulating materials may be handled.

4. **EASE OF OPERATION**—the MOCO Enameling Oven is designed to eliminate any climbing or stooping. A new rapid start-and-stop device increases production.

5. **LOW OPERATING TEMPERATURE**—a high degree of heat transfer efficiency allows lower operating temperature with additional savings in fuel.

also A NEW STRAND ANNEALING OVEN WITH HIGHER OPERATING SPEEDS

Revolutionary design features eliminate or greatly reduce *any* annealing problems. Advanced mixing and burning equipments are utilized which exclude the need for troublesome external sources of steam or other inert atmospheres. Tried and proven in over 30 successful installations, these ovens are daily producing high quality wire at a greater range of speeds with less operating and maintenance costs.

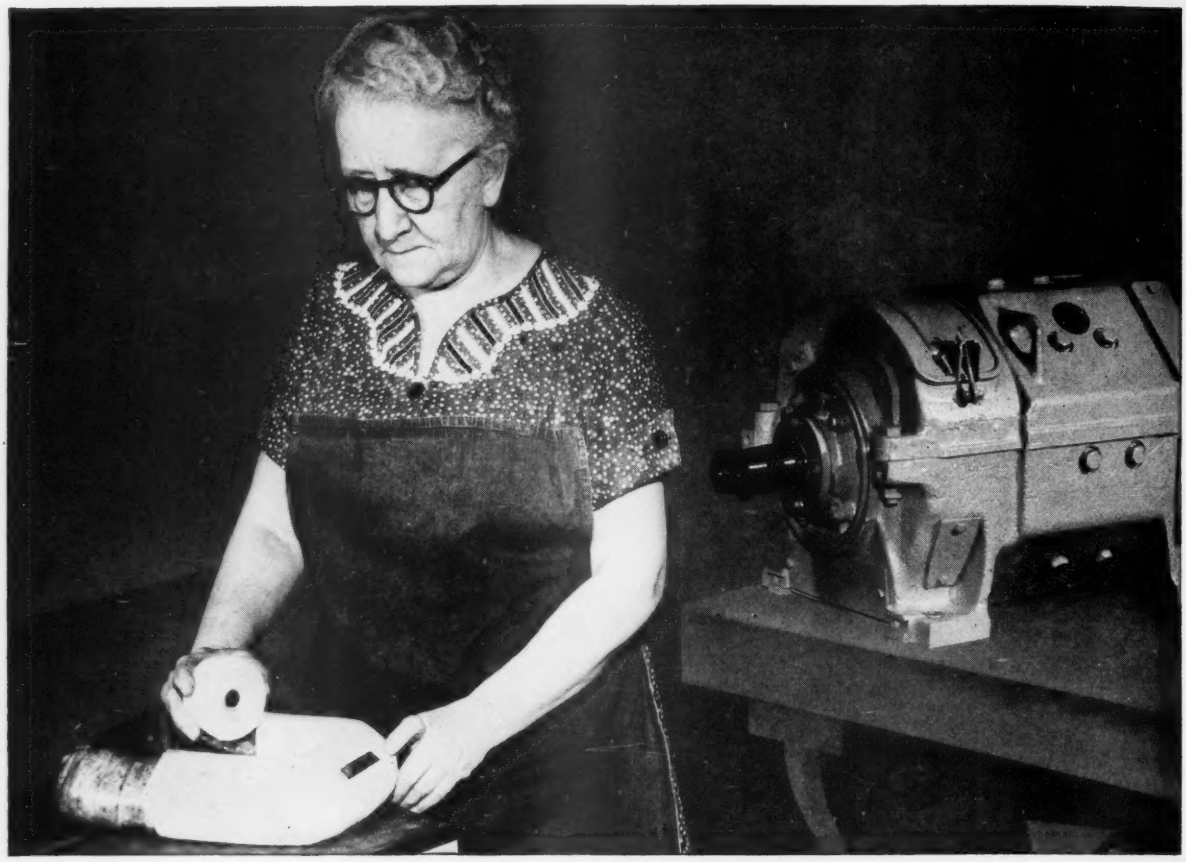


A typical installation of 6 inclined model MOCO annealing ovens operating in series with wire enameling equipment. Also available in horizontal or vertical mounting positions.

FOR COMPLETE INFORMATION on MOCO wire product equipment, call in your MOCO representative or contact MOCO in Detroit today.

MICHIGAN OVEN COMPANY

425 BRAINARD • DETROIT 1, MICHIGAN



General Electric uses Fiber·Glass tape to withstand high temperatures, heavy overloads

This photo shows Fiber·Glass tape being applied to a field coil, in the manufacture of General Electric Armored Motors, type MD.

These motors, produced by the Erie, Pennsylvania Works of General Electric Direct Current Motor and Generator Department, are used in the toughest applications—as steel mill auxiliaries, ore bridge, crane, hoist, and electric shovel applications. They need the finest insulation available to withstand high temperatures and heavy overloads, hence the use of Fiber·Glass.

Tapes made with L·O·F Fiber·Glass are used where prolonged overloads generate heat too great for organic tapes. They are strong. They resist moisture.

For the wire and cable industry, Libbey·Owens·Ford produces a complete series of continuous filament yarns, including: 75, 150, 225, 450 and 900 series. They are made in a variety of single- and multiple-end packages for use on standard wire-covering and textile machines. Waxed yarns are available, as well as special after-treatments.

Consult us on your electrical needs. Contact your nearest L·O·F office (offices in 26 major cities). Or, write: Libbey·Owens·Ford Glass Company, Fiber·Glass Division, 26-104 Wayne Building, Toledo 3, Ohio.

L·O·F GLASS Corrulux FIBER·GLASS

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LIBBEY • OWENS • FORD GLASS COMPANY
FIBER • GLASS DIVISION

SCHUMAG AACHEN

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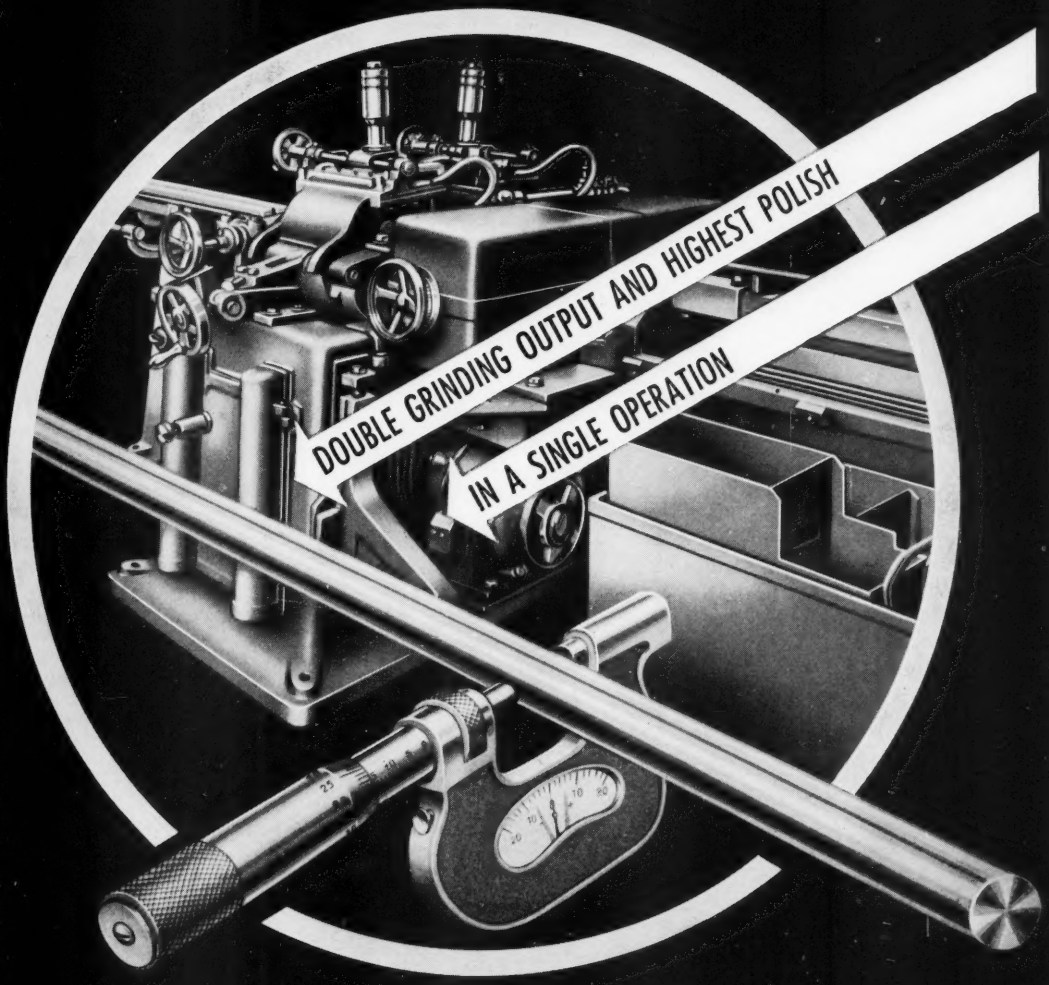
CENTERLESS BAR GRINDING AND POLISHING MACHINE



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The efficient lubricant for WIRE DRAWING!

In drawing wire . . . where production and profits depend on speed, a really efficient drawing lubricant is a key operator on your high production team. Actually, the greater your speed of production — the more you depend on the quality, the efficiency of your lubricants.

Swift's soaps are efficient and dependable because Swift's technical laboratories work consistently to maintain high product quality . . . to develop *better* soaps for industry. All of Swift's soaps are produced to meet rigid specifications from the finest raw materials obtainable.

FAST SERVICE

There is a Swift's soap distributor near you . . . 375 of them throughout the U. S. and Canada to provide you with quick delivery and resourceful service. So, next time you need a drawing lubricant, investigate Swift's soaps — see why they are so widely depended upon wherever tough wire drawing jobs call for *real efficiency.*

IMMEDIATE DELIVERY ON THESE QUALITY SOAPS . . .

- Powdered White Ribbon
- Guaranteed Powder
- Snap Heavy Duty Wire
- Drawing Powder No. 282
- No. 559 Powdered Soap

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ONE TRIAL IS BETTER THAN A THOUSAND CLAIMS

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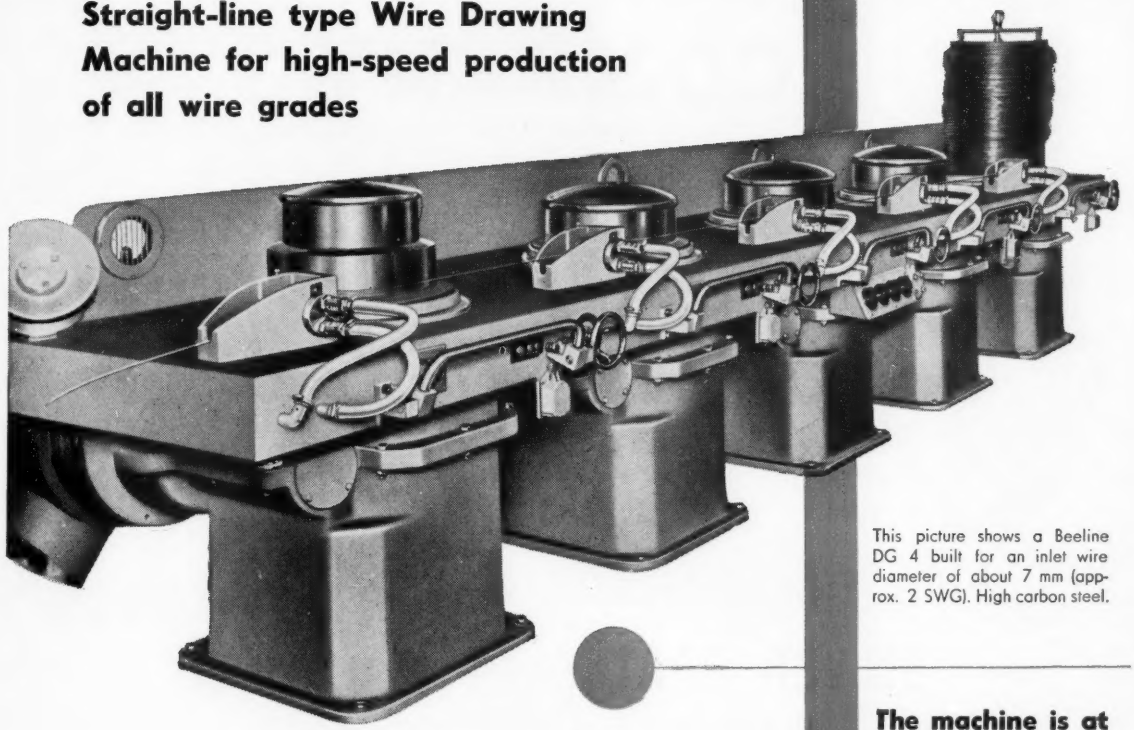
THE BEELINE WIRE DRAWING MACHINE

Straight-line type Wire Drawing Machine for high-speed production of all wire grades



This picture shows a Beeline DG 4 built for an inlet wire diameter of about 7 mm (approx. 2 SWG). High carbon steel.

Prominent Beeline features:

- Complete absence of slipping between wire and block.
- Direct block-to-block wire running, with automatic speed control and no loops or other mechanical adjusting devices.
- Continuous speed adjustment from almost zero up to maximum.

Let us help you solve your problems. We shall be glad to answer your questions promptly. Don't forget to let us know what wire is to be drawn, the inlet and finished diameter, its intended use, the production required, and all other relevant information (tensile strength of the finished wire etc.). Then we can suggest a machine that is just right for you.

The machine is at present manufactured in three different sizes:

BEELINE DG 5:
for heavy wire, about 13 mm. (7/0 SWG)

BEELINE DG 4:
for wire rods, about 7 mm. (2 SWG)

BEELINE DM 3:
for wire with an inlet diameter of about 3 mm. (11 SWG)

MH

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Cables: Morgårdshammar, Ludvika. Tele: 0240–71100

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BARE ELECTRICAL TINSEL CONDUCTORS

in long lengths, ready for insulating with textile rubber or plastic.

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Telephones — Radios — Electric Shavers — Hearing Aids.

Used Bare for Voice Coil Lead Wires on Loud Speakers

Electric Shaver Tinsel meets U/L Standards

SILVER COATED COPPER WIRE

To ASTM Specifications for UHF Cables and Hook-up Wire to Industry and Government Specifications.

TINSEL LAME (FLAT WIRE)

Silver and False Gold Coated Copper

also

Aluminum Tinsel (Slit Foil)

Gold - Silver - Red - Green - Blue

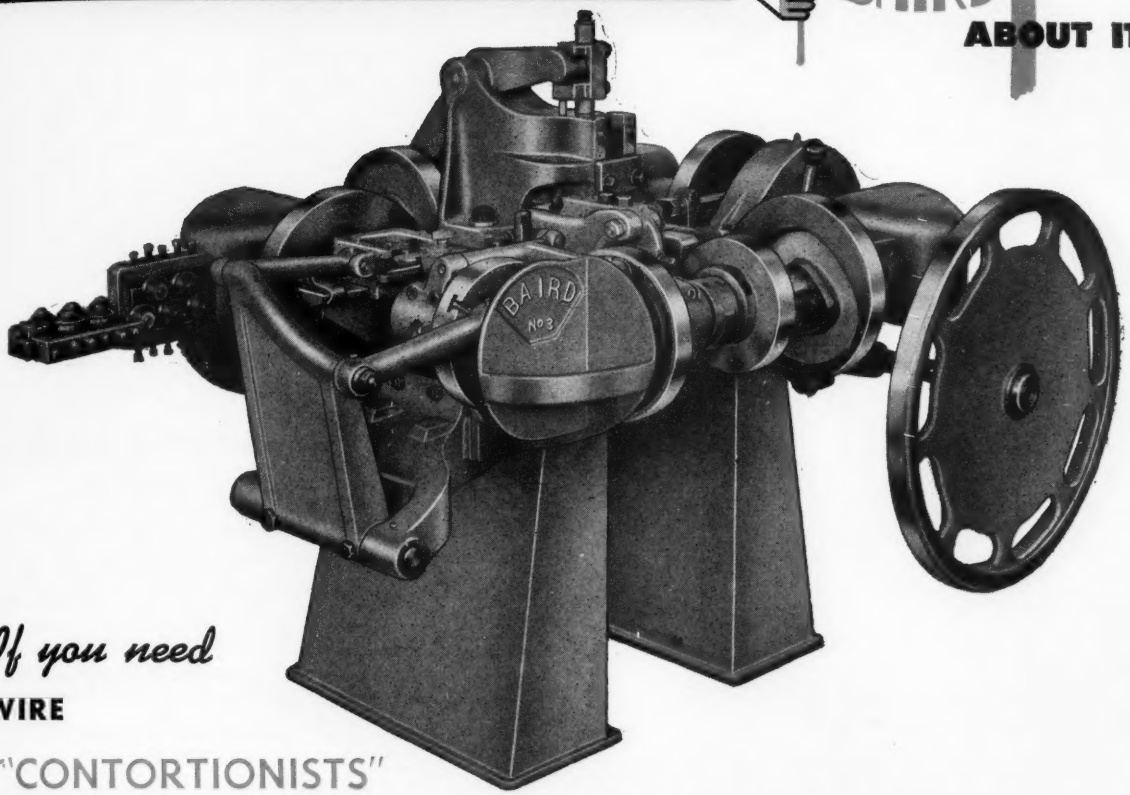
for weavers of ribbons and garlands

"NEVA-TARN" GOLD & SILVER TARNISH PROOF YARNS

Plain, Supported or made into Novelty yarns. For knitters and weavers of dress, upholstery and drapery fabrics.

. . . IF IT'S A HIGH PRODUCTION PROBLEM . . .

ASK BAIRD ABOUT IT



If you need

WIRE

"CONTORTIONISTS"

The BAIRD FOUR-SLIDE is your FORMING MACHINE

There is probably no machine in the world that can make a greater variety of parts . . . or produce them any faster . . . than the Baird Four-Slide. It seems that there must be a limit to the fashioning of small wire and metal ribbon products *by hand* . . . and then tooling a Baird Machine to make them *automatically.* Yet, new shapes are continuously submitted to us . . . and we still find the solutions.

Taking coiled wire from a reel, the machine straightens, feeds, and cuts off the required length . . . then forms and ejects the part. Different sizes of standard machines give you a selection of wire lengths to 32½" . . . dia. to ½" or flat ribbon metal products to 1½" wide. Special attachments such as *secondary cut-offs, lettering, form raising, pin pulling, nail pointing, vertical forming and stripping, ring setting, etc.,* extend the versatility of operations.

Thus you may purchase your machines for specific repetitive production, then, at any time, add special attachments as your production requirements indicate. At all times you may count on Baird engineers for development of tooling from your parts or specifications.

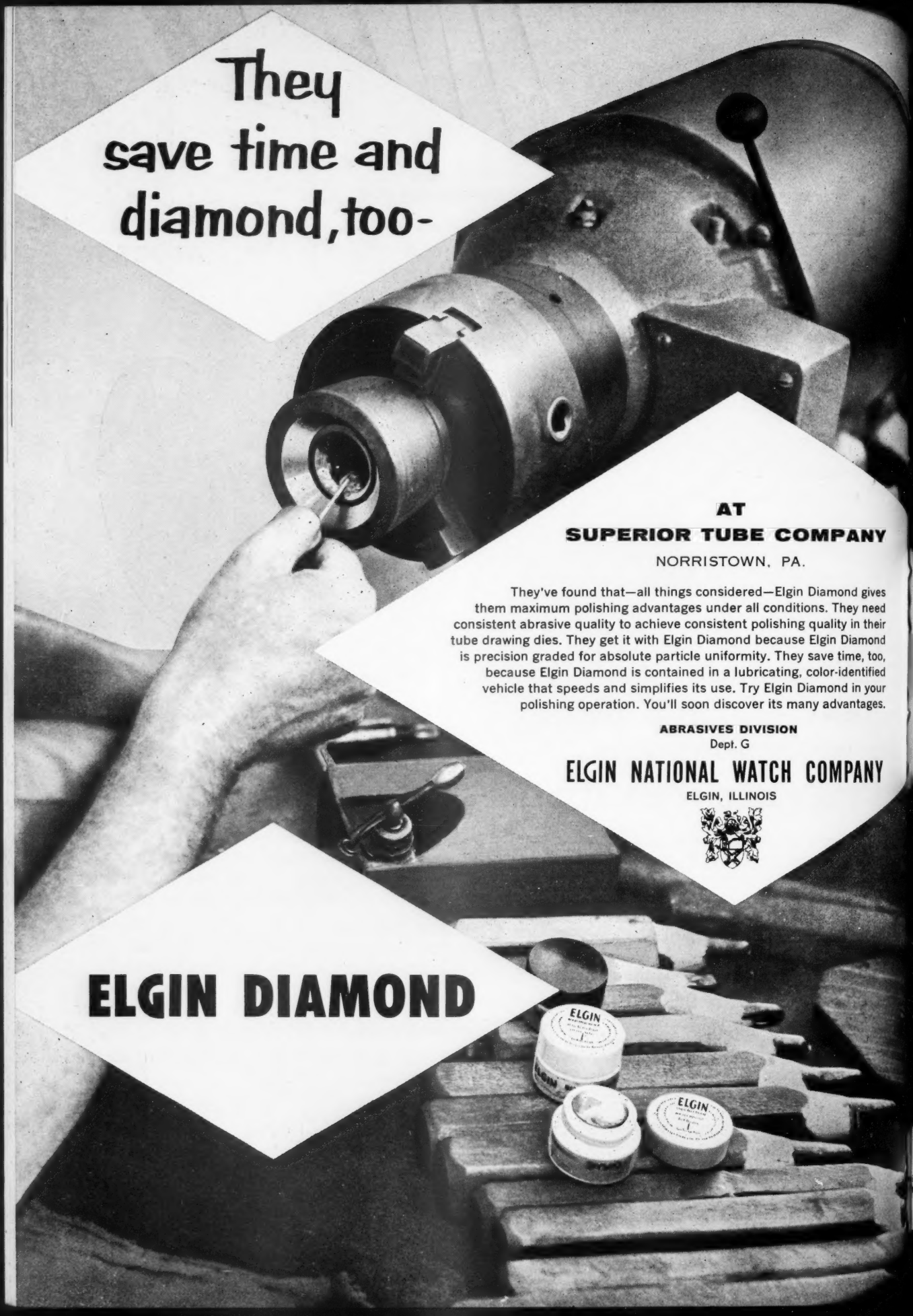
This is your profit-making machine. Send for the Baird Four-Slide Bulletin.

2BA54

THE BAIRD MACHINE COMPANY
STRATFORD CONNECTICUT

WHERE YOU WILL GET THE HELP OF SPECIALISTS ON THESE ESSENTIAL PRODUCTION PROBLEMS:

AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & RIBBON METAL FORMING MACHINES • AUTOMATIC PRESSES • TUMBLING BARRELS


They save time and diamond, too-
AT
SUPERIOR TUBE COMPANY
NORRISTOWN, PA.
They've found that—all things considered—Elgin Diamond gives them maximum polishing advantages under all conditions. They need consistent abrasive quality to achieve consistent polishing quality in their tube drawing dies. They get it with Elgin Diamond because Elgin Diamond is precision graded for absolute particle uniformity. They save time, too, because Elgin Diamond is contained in a lubricating, color-identified vehicle that speeds and simplifies its use. Try Elgin Diamond in your polishing operation. You'll soon discover its many advantages.
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ELGIN congratulates the WIRE ASSOCIATION

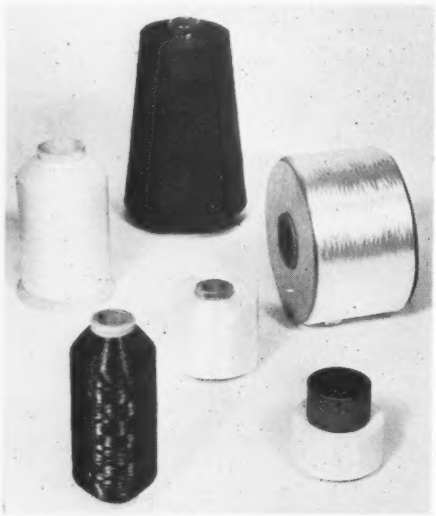
25th Anniversary

THIS IS PART OF ELGIN'S FIELD ENGINEERING FORCE WHOSE JOB IT IS TO GIVE YOU THE BEST IN SERVICE

INSULATING TEXTILE FIBRES

SYNTHETICS • COTTON

Synthetic yarns of Viscose Rayon, Acetate Rayon, High Tenacity Cordura, Nylon, Dacron, Orlon and Fortisan, together with Purified Cotton (manufactured under Western Electric License), furnished you on Single or Multiple Wound Braider or Serving Tubes, in standard packages.



Some of the many packages available

Special Twisting, featuring Knotless Packages, is also done. We can supply all yarns in constructions and in packages to your exact specifications.

Cotton yarns in all sizes.

DYED YARNS ARE OUR SPECIALTY

Synthetic and Cotton Yarns Treated for Electrical Applications

WAXED LACING CORDS
CORE YARNS

In fact, any yarn requirement for electrical insulation is either carried in stock or can be processed for you in our up-to-the-minute manufacturing facilities.

Write today for Information

SYNTHETIC THREAD CORP.

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'Phone: STerling 8-5700

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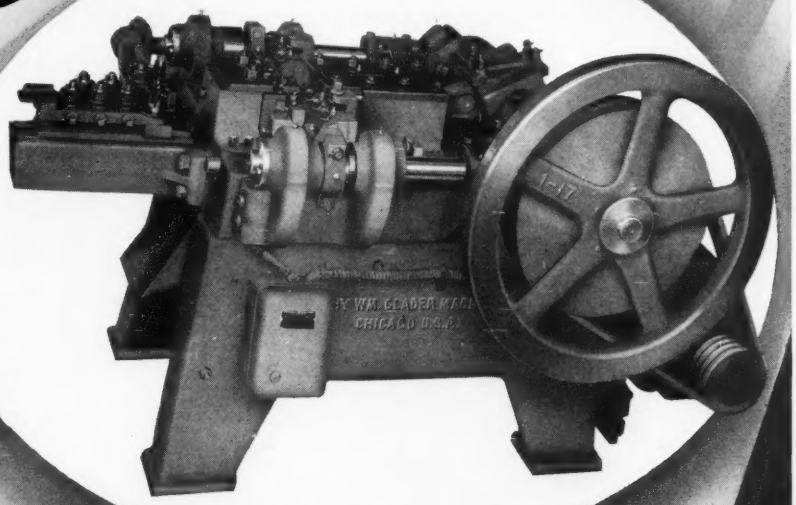

NAIL MACHINE

STAIRWAY TO ECONOMICAL NAIL PRODUCTION

4 PROVEN PERFORMANCE

3 HIGH EFFICIENCY

2 RUGGED CONSTRUCTION

1 LOW MAINTENANCE COSTS

Whatever your requirements—¼" brads or 12" spikes—there is a GLADER available. Eleven sizes and types of machines—all with years of proven performance.

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RESISTANCE WELDING MACHINES

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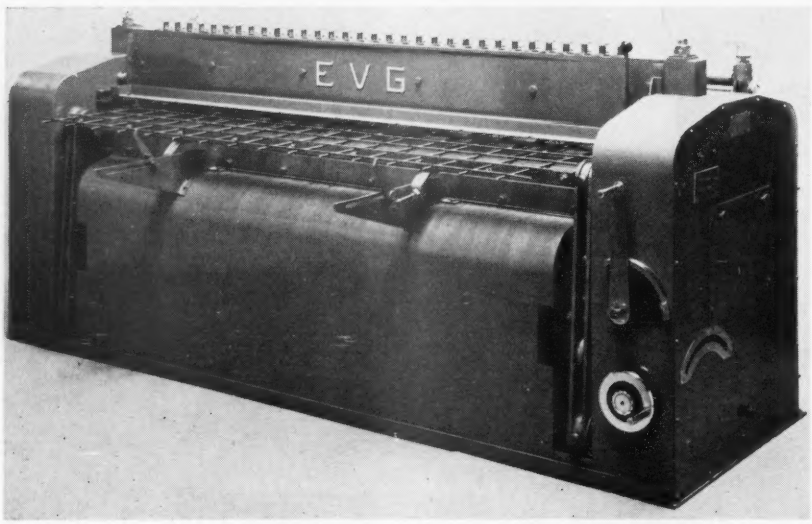
WELDED WIRE FABRICS

Well-known for years throughout Europe, the complete EVG line of Wire Fabric Welding Machines is now being introduced for the first time to the American market.



- FULLY AUTOMATIC from feed to take-up.
- ALL DIAMETERS—ALL MESH SIZES—ALL SPACINGS
- ELECTRONICALLY TIMED and Precision Built, EVG Multi-Spot welding machines offer a new achievement in SPEED, ACCURACY and UNIFORMITY of products.

Three standard types*, known as the "UNIVERSAL," the "PRECISION" and the "HIGHSPEED" produce fabric and mesh in widths from 72" to 156". Wire gauges (AS&W) accommodated are 4/0-12, 5-14 and 16-22. Mesh spacings from ½" upward in ½" steps. Productions speeds up to 90 to 100 cross wires per minute.

***Special machines can be manufactured to your own specifications to meet your particular requirements.**

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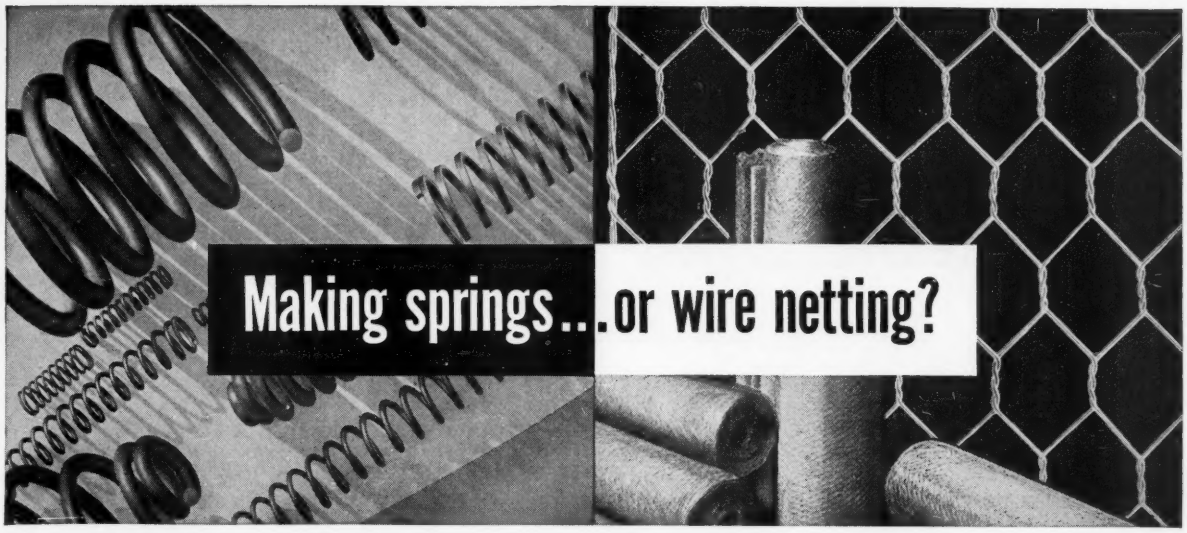
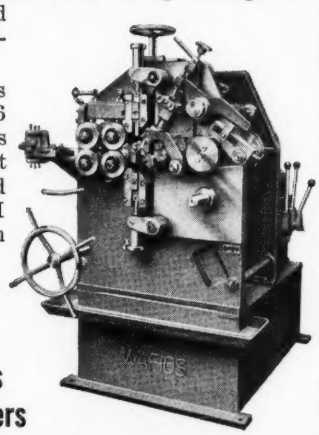


Use the 60 years' experience built into WAFIOS automatic machines

You can produce right and left-hand springs in cylindrical, single and double-cone shapes, both open and close-wound with WAFIOS UNIVERSAL AUTOMATIC SPRING COILING MACHINES. Specially shaped springs, springs with closed ends and torsion springs with shanks can also be manufactured on these machines.

They're compact, accurate, simple and economical machines to operate and easily adjusted; have 2-3 wire feed speeds; 18 to 30 steps for wire length adjustment. Automatic stopping of feed rollers during cutting off. Coiling dies, pitch tool and cutter mandrel can be adjusted during operation.

Type UFM50R handles wire sizes from #19 to #6 AS&WG—produces springs up to 3" outside diameter at rates of about 48, 68 and 88 per minute. Other UFM types for wire sizes from #40 AS&WG to 5/8".



Other Wafios Machines for spring manufacturers

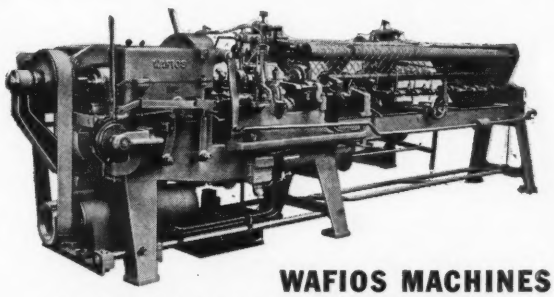
Spring end grinders; simple spring coilers; machines for special tension springs; winders for cylindrical tension and compression springs, bowdencoils, spirals for electrical appliances, baby carriage springs, spirals for spring roller bearings, special section spirals, springs for clothes pegs; looping machines; lock washer machines; torsion spring winders.

Write for Catalog No. 201

WAFIOS
MASCHINENFABRIK
Wagner, Ficker & Schmid • Reutlingen 3, Wuerttemberg, Germany

All types of square mesh netting with both edges knuckled or with ends spiral twisted are made on this WAFIOS AUTOMATIC DOUBLE SPIRAL CHAIN LINK FENCING MACHINE. Width of mesh from 3/8" to 2". For wire sizes from 16½ to 9½ AS&WG.

Other sizes and types for automatic and semi-automatic manufacture of chain link fencing in a wide range of mesh widths and wire sizes.



WAFIOS MACHINES for Wire Netting and Wire Mesh Fabrics...

Complete equipment for the manufacture of hexagonal, straight line and triangular mesh wire netting.

Automatic machinery for the manufacture of barbed wire and staples.

Round mesh weaving machines for the manufacture of 1-, 2- and 3-ply round mesh weaving for mattresses and other applications. Manual, semi-automatic and automatic types. Also used for crossed and interwoven mesh for many other applications.

Wire crimping machines in manual and automatic types.

Assembling looms for the manufacture of crimped mesh from crimped wire.

Write for Catalog No. S-100

Sole distributor for U.S.A.:

KURT ORBAN COMPANY, INC.
34 Exchange Place, Jersey City, N. J.

Sole agents for Australia and New Zealand:
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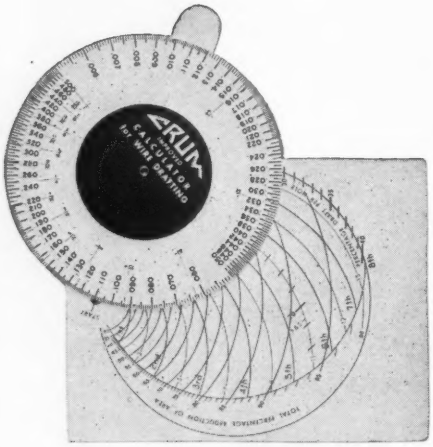
THE NEW and IMPROVED . . .

CRUM CALCULATOR

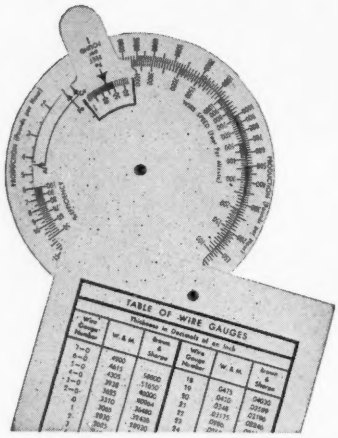
FOR WIRE DRAFTING



Front view of Crum Calculator.

THIS NEW DOUBLE-PURPOSE CALCULATOR WILL:

1. Provide quicker and more accurate information on die sizes and reduction areas;
2. Calculate wire production rates for various speeds and efficiencies.



Reverse view of Crum Calculator.

SOME OTHER FEATURES OF THE CALCULATOR

- Has new scale for more accurate determination of small percentages.
- Gives readings in B & S gauges.
- Intermediate lines provide reductions for 16 holes in one setting.
- New rectangular shaped back for better protection of calculator.
- More legible % draft-per-hole scale.
- Vinyl plastic construction, resistant to wear, warping, dirt, perspiration, wire drawing soaps—can be cleaned.
- Still fits your vest pocket.
- Handy tables of W & M and B & S gauges.
- Feet per pound calculating scale for steel, copper and aluminum wires.
- Durable, accurate, easy to use.

The improved Crum Calculator is worth its weight in gold in time saving —no laborious mathematical calculations necessary when you use it. Instruction sheet with examples accompany each Calculator. You should have one or more in your wire drawing department.

THE PRICE: $5.00 EACH

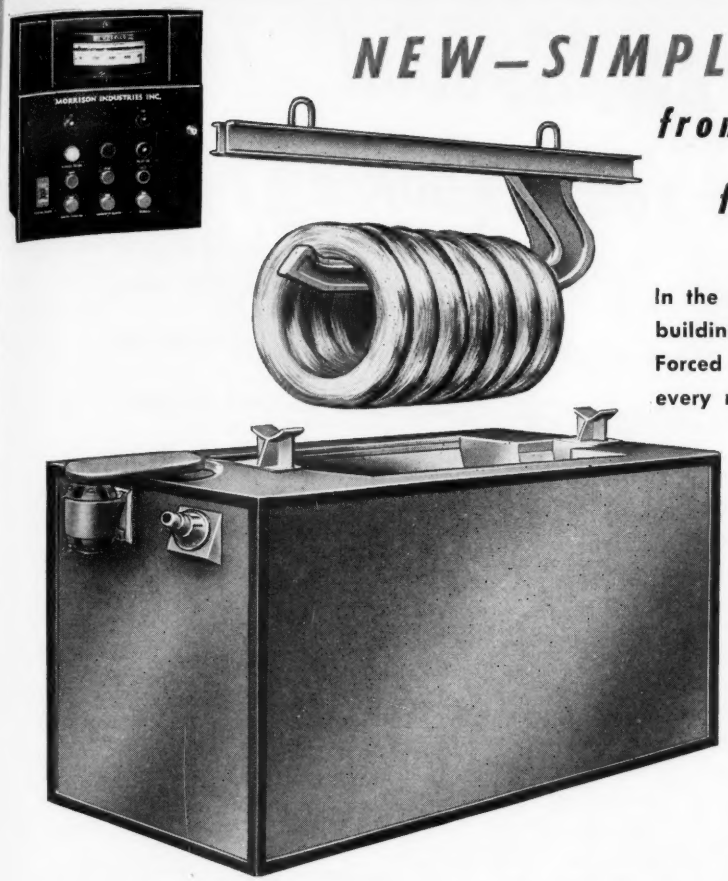
Send your orders to:

WIRE AND WIRE PRODUCTS

453 MAIN STREET **STAMFORD, CONN.**

(Exclusive distributors)

NEW—SIMPLIFIED—SMALLER
from the HEADQUARTERS for FLASH BAKERS!



In the nearly 20 years that our engineers have been building rod and wire bakers, they originated the Forced Convection Truck Type—the Flash Baker—and every major improvement in Baker Design.

NEW FEATURES OF THIS MODEL—

SMALLER SIZE—requires only shallow pit no larger than baker proper; FASTER BAKING—promoted by a new system of air distribution and reduction of waste space in Baking chamber; EASIER MAINTENANCE—because all working parts are above floor level; GAS OR OIL FIRED—combination burner permits switching from one fuel to other instantly; SHIPPED COMPLETELY ASSEMBLED—connect fuel lines and field wiring to complete installation.

NEW NAIL GALVANIZER

ANOTHER JOHN R. MORRISON SPECIAL

Built for medium production and one man operation, this Nail Galvanizer has all features of larger units. Production varies from 600 to 1000 pounds per hour, depending upon requirements. The unit occupies a minimum of floor space—about 10′ x 10′.

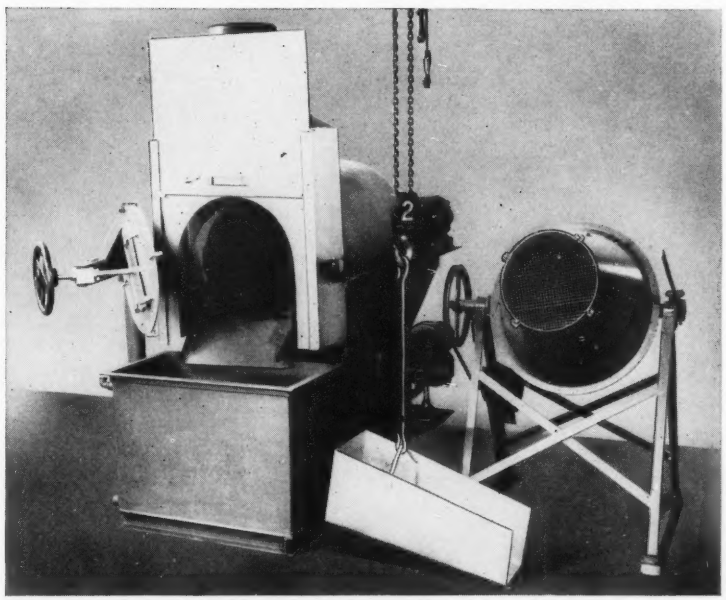
The main cylinder is heated from a brick lined combustion chamber which may be either gas or oil fired.

By reversing the rotation of the cylinder, the nails or parts are discharged through baffles into water. Nails are transferred by hoist to tumbling barrel where they are dried and brightened.

Drying and kegging operations take place while another batch of nails is being galvanized in the cylinder.

Larger capacity units are available with automatic washing and drying facilities.

WE FURNISH THE COMPLETE INSTALLATION.



Write for Complete Information on Both of These Special Process Machines.

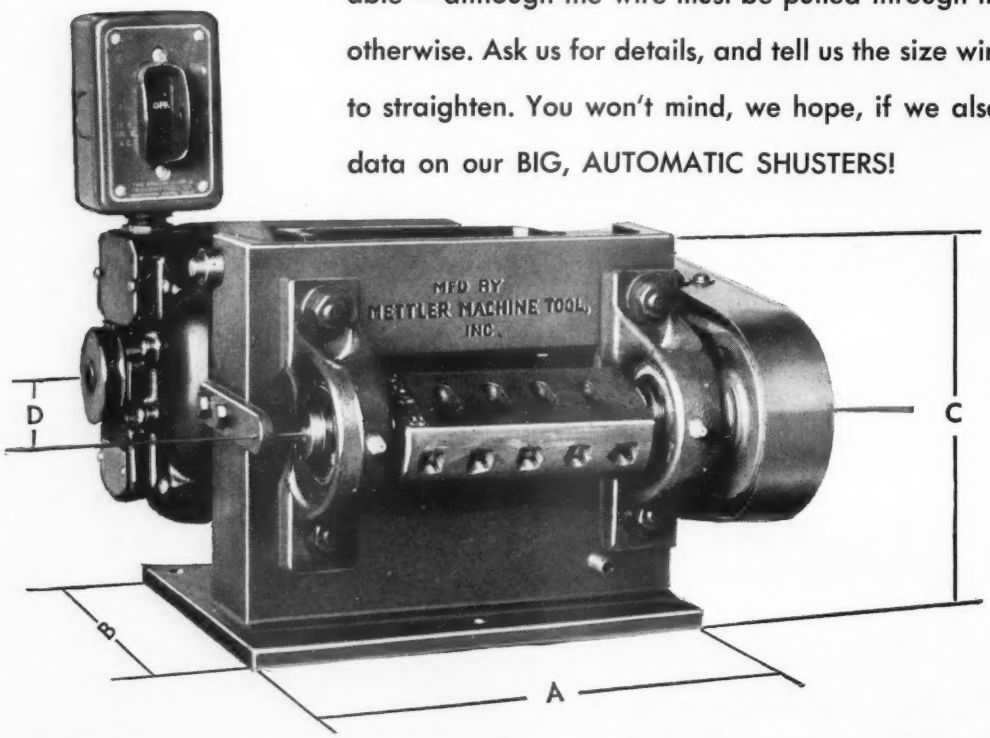
JOHN R. MORRISON AND ASSOCIATES

17100 MILES AVENUE • CLEVELAND 28, OHIO

Export Sales: Seybold Transworld Exporters, 122 East 42nd Street, New York 17, N. Y.

Here's a SHUSTER "Special" That May Be Just What You're Looking For!

Yes, SHUSTER does make small, motor driven, rotary wire straighteners. They compare in quality but not in size, with our big SHUSTERS. They're small, rugged, accurate and dependable — although the wire must be pulled through manually or otherwise. Ask us for details, and tell us the size wire you wish to straighten. You won't mind, we hope, if we also send you data on our BIG, AUTOMATIC SHUSTERS!



Model R.M.D.	Dia. Wire	A	B	C	D	Motor	Specials
1	1/32"	9½"	8"	7⅞"	8"	½ H.P.—3450 RPM	Special Arbor and Dies
2	1/16"	9½"	8"	7⅞"	8"	½ H.P.—3450 RPM	
3	1/8"	12½"	9"	9⅜"	8"	¾ H.P.—3450 RPM	
4	3/16"	14⅝"	9½"	9¾"	8⅜"	1 H.P.—3450 RPM	

- High speed integrated motor drive for efficient straightening.
- Ideal for small wire: each machine will also handle several sizes smaller than its rated capacity.
- No feeding attachments included. Wire must be pulled through mechanically or by hand.
- 4 models immediately available.

Manufactured by

METTLER MACHINE TOOL, INC.

132 W. Lawrence St., New Haven, Conn.
N. Y. Office: 11 Broadway — Tel: WH 4-5480

SHUSTER

Automatic

Since 1866

WIRE STRAIGHTENING AND CUTTING MACHINES

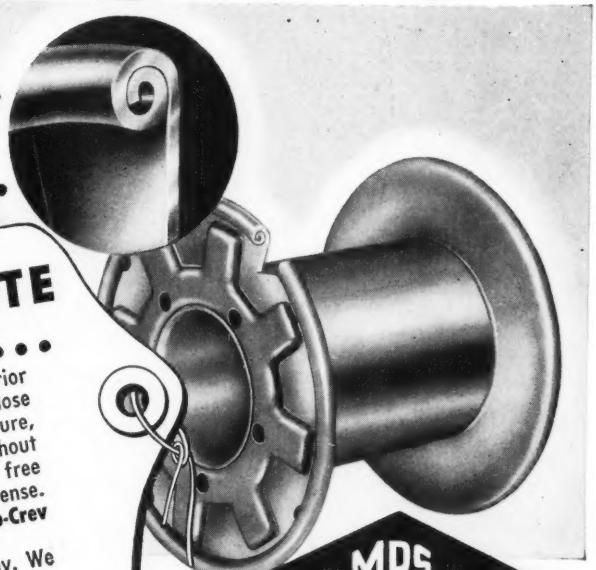
Welcome

TO MEMBERS AND GUESTS ATTENDING THE *Silver Anniversary* CONVENTION

Announcing one of our newest engineering advances
SUPERIOR MPS SPOOLS and REELS WITH THE EXCLUSIVE CONVOLUTE DURACURL RIMS

The Difference

IS HERE.....



NEW MPS CONVOLUTE DURA CURL RIMS...

The difference between just any spool or reel and Superior MPS CONVOLUTE DURA CURL Rims is well worth your close attention. Because now, with this exclusive MPS feature, maximum strength and rigidity are obtained throughout the reel heads. You can now have continuous trouble free high speed winding, without spool straightening expense. These new MPS spools also have the famous **No-Crev** feature.
Ask about MPS CONVOLUTE DURA CURL RIMS today. We invite your inquiries.

MPS CONVOLUTE Dura Curl Spools & Reels
give you brute strength with dimensional precision, concentricity, and balance. Another patented MPS development engineered to **help you!**

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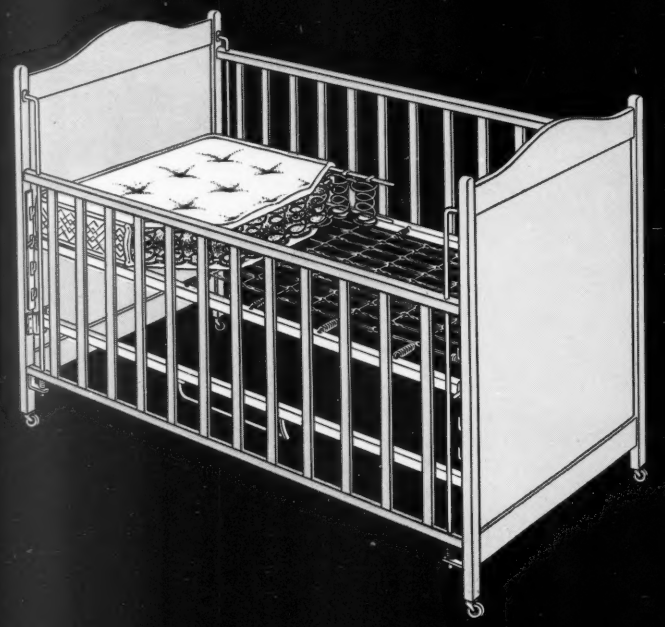
Mossberg PRESSED STEEL *Corporation*

#110

One thing in common...

ALL USE



Oil Tempered
MB Spring Wire

Hard Drawn MB Spring Wire

Picture Cord Wire

Shaft Wire

Spheroidized Wire

Clip Wire

Brush Wire

WICK·WIRE WIRE

The products illustrated in our recent series of advertisements run the gamut of variety —from cribs to umbrellas; from automobiles to living room furniture. One thing they have in common, however—they all use Wickwire Wire.

These typical products—just a few among thousands that utilize Wickwire Wire—furnish striking evidence of Wickwire's diversified production . . . proof of our ability to provide you with a single, dependable source of supply for every type of wire you may need in the fabrication of your particular product.

Let us know your requirements in any specialty steel wire. We are prepared to meet your most exacting specifications for wire of high or low carbon steel—round or shaped—in all tempers, finishes and grades.

For the wire you require—check first with Wickwire

THE COLORADO FUEL AND IRON CORPORATION—Denver and Oakland
WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago
Detroit • New Orleans • New York • Philadelphia

WICKWIRE WIRE

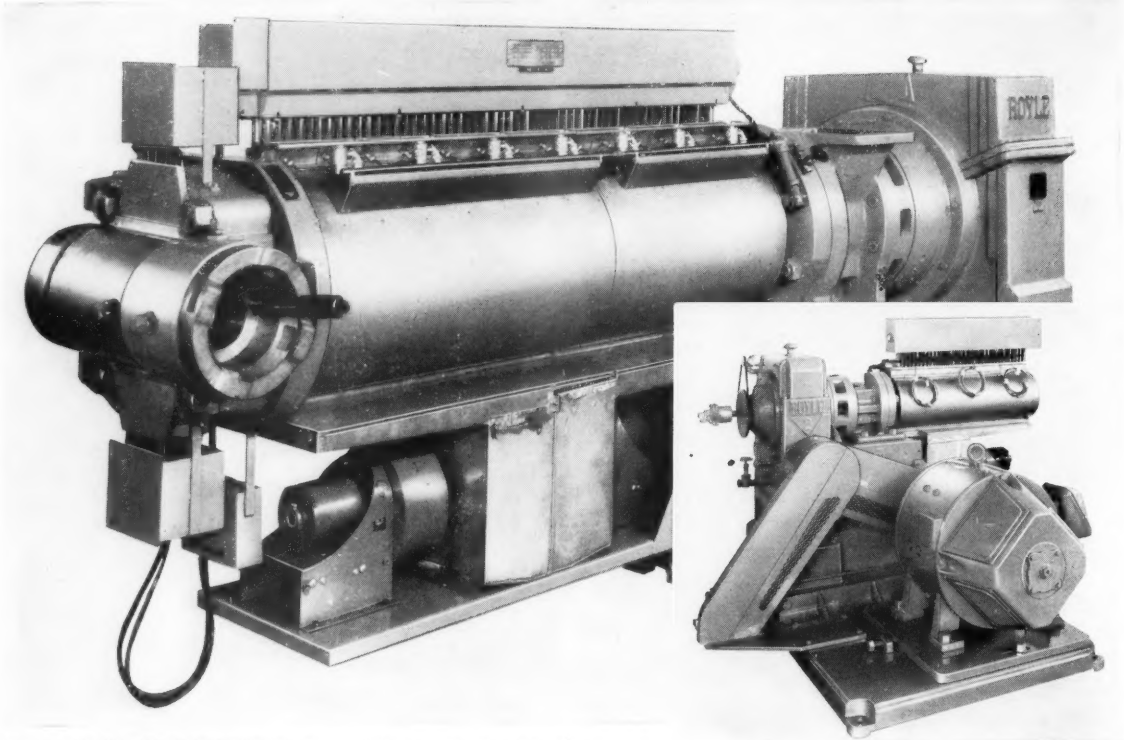
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

Hose Reinforcement Wire

Bobby-pin Wire

Staple Wire

The ROYLE ALL-ELECTRIC SPIROD *FOR INSULATING WIRE*

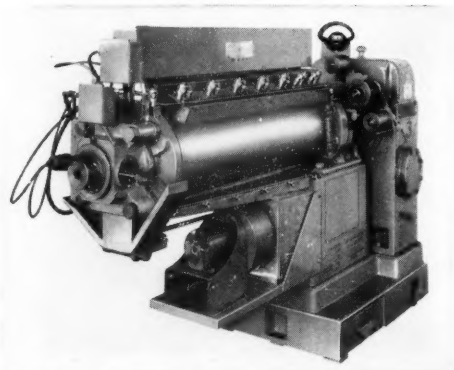


No. 5 8½" ROYLE EXTRUDER for applying plastic insulation to cable up to 4½" diameter.

No. 2 ROYLE SPIROD extruder for plastic wire insulation equipped with hydraulic synchronized tandem capstan and take-up drive.

JOHN ROYLE and SONS, designers and builders of extruding machines since 1880, offer their all-electric Spirod—the latest addition to the Royle line. Available in standard sizes, 1⅛" through 12", these extruders are built to supply and hold the higher, and accurately zoned, operating temperatures that are essential to the processing of plastic compounds. Such outstanding performance is only possible with the inclusion of a proportioning controlled system of high velocity evaporative cooling combined with tubular resistance heating—one of the many features of Spirod that assure dependable, economical production.

Royle all-Electric Spirod extruders are in production on fluorothenes, silicones, vinyls, polyethylene, nylon, rubber, neoprene, butyl rubber, and other polymers and co-polymers.



No. 3 ROYLE SPIROD for plastic insulated wire. Four temperature zones automatically controlled for proportioned cooling as well as heating.

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PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

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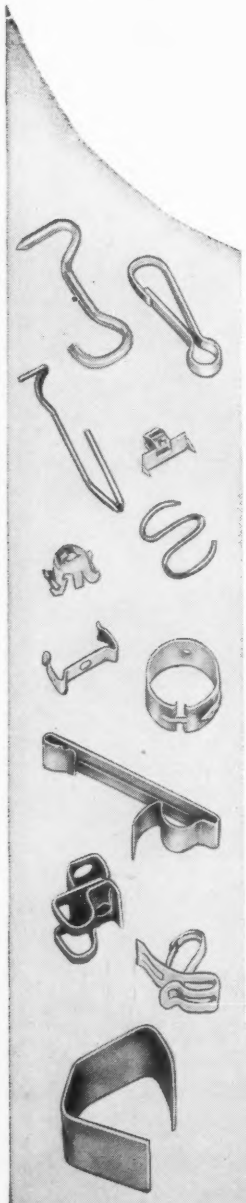
Combine Operations to Lower Costs on Metal Stampings.



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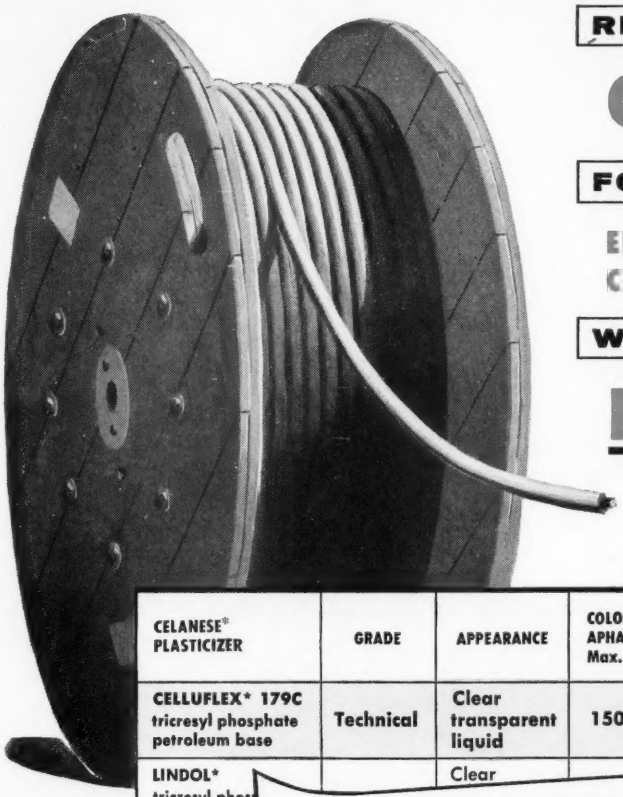
CELANESE* PLASTICIZER



RECOMMENDED

CELLUFLEX* 179C

FOR

ELECTRICAL WIRE AND CABLE COATINGS

WHY

FLAME RESISTANCE

DESCRIPTIVE DATA

CELANESE* PLASTICIZER	GRADE	APPEARANCE	COLOR APHA Max.	SPECIFIC GRAVITY @ 20/20° C.	ACIDITY	ESTER VALUE % Min.	PERMANGANATE TIME, Min. (in Minutes)	REFRACTIVE INDEX @ $n\frac{20°\ C.}{D}$
CELLUFLEX* 179C tricresyl phosphate petroleum base	Technical	Clear transparent liquid	150	1.165 ± .005	0.01 (3)	99	30	1.553 (5)
LINDOL* tricresyl phos… coal tar ba…		Clear						…56
CELLUFLEX dibutyl ph…								…389
CELLUFLEX a mixed est…								…0 (5)
CELLUFLEX* triphenyl ph…								1.550 (6)
CELLUFLEX* DOP dioctyl phthalate	Technical	Clear transparent liquid	50	0.985 ± .002	0.01 (2)	98	—	1.4859

now available in limited commercial quantities

CELLUFLEX 179 EG

Ask your Celanese representative about this new electrical grade Tricresyl Phosphate, specially developed for insulation applications.

(1) @ 60/60°C. (2) % as phthalic, max. (3) % as phosphoric, max. (4) Molten (5) @ $n\frac{25°\ C.}{D}$ (6) @ $n\frac{60°\ C.}{D}$

Celluflex 179C — tricresyl phosphate commercially developed by Celanese—is recognized as the No. 1 flame-resistant plasticizer. Its low volatility, excellent solvent power and high degree of permanence produce tough flexible vinyl coatings for transformer wires and electrical cable.

Celanese is an expanding source of plasticizers for many jobs. Bulk stocks at convenient distribution points are ready to meet tight schedules. Combination shipments—Celanese Plasticizers and Solvents or Intermediates—yield an extra dividend in price differential and freight savings. Be on our mailing list for new plasticizer developments. Please drop a card to Dept. 590-J. Celanese Corporation of America, Chemical Division, 180 Madison Avenue, New York 16.

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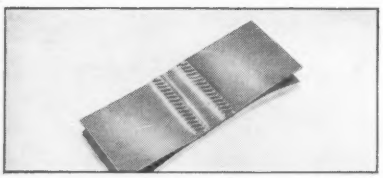
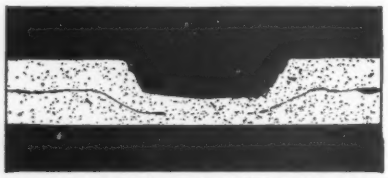
Simply squeeze like pliers, and presto...

ALUMINUM cable sheathing or shielding IS KOLDWELDED!



You never saw aluminum welded so quick and easy! Photo shows .004 aluminum foil shielding just as it came out of the Utica Lapwelder.



You get a real *weld*, not just a bond. Microphoto shows lapweld in .004 aluminum foil. Note Koldwelded area in center shows actual inter-molecular flow of metal . . . *both* foil sheets become a single homogeneous unit (Photo made by Alcoa Process Dev. Labs., Welding Section, Project K-15).

Koldwelding work-hardens the metal, so weld areas are often stronger than the parent metal itself! Shown is .030 aluminum cable sheathing which was Koldwelded in flat strip, then passed thru machine which wrapped it around a BX-type cable of 4" diameter. Note that neither the great tension nor severe twisting in the machine damaged the Koldweld in the least.

Now being used in production by several major cable manufacturers, UTICA® Koldwelding offers advantages no other type of welding can match! Koldwelded joints are *far stronger*—standard tensile tests on .004 aluminum foil 1" wide measure better than 60 lbs. and the metal breaks outside the weld area. On tear type tensile tests, strength is in excess of 20 lbs. More than that, Koldwelded joints are **dependably** strong—they even go thru the stretching and twisting of BX-type cable covering machines without distortion or fracture...so giving your production a solid boost!

The light UTICA® Koldwelding tool weighs less than 3 lbs. You can carry it from job to job easily, use it in tight spots inside your machines. No special skill is needed—no heat, electricity or fluxes . . . **welding is by pressure alone!** No flash occurs. One set of UTICA precision dies will Koldweld all gauges of aluminum foil from an overall thickness of .002 to .026 and other interchangeable dies will Koldweld aluminum sheets to a maximum thickness of .040, total weld .080. Get all the facts on this new type of welding. Write now for full information.

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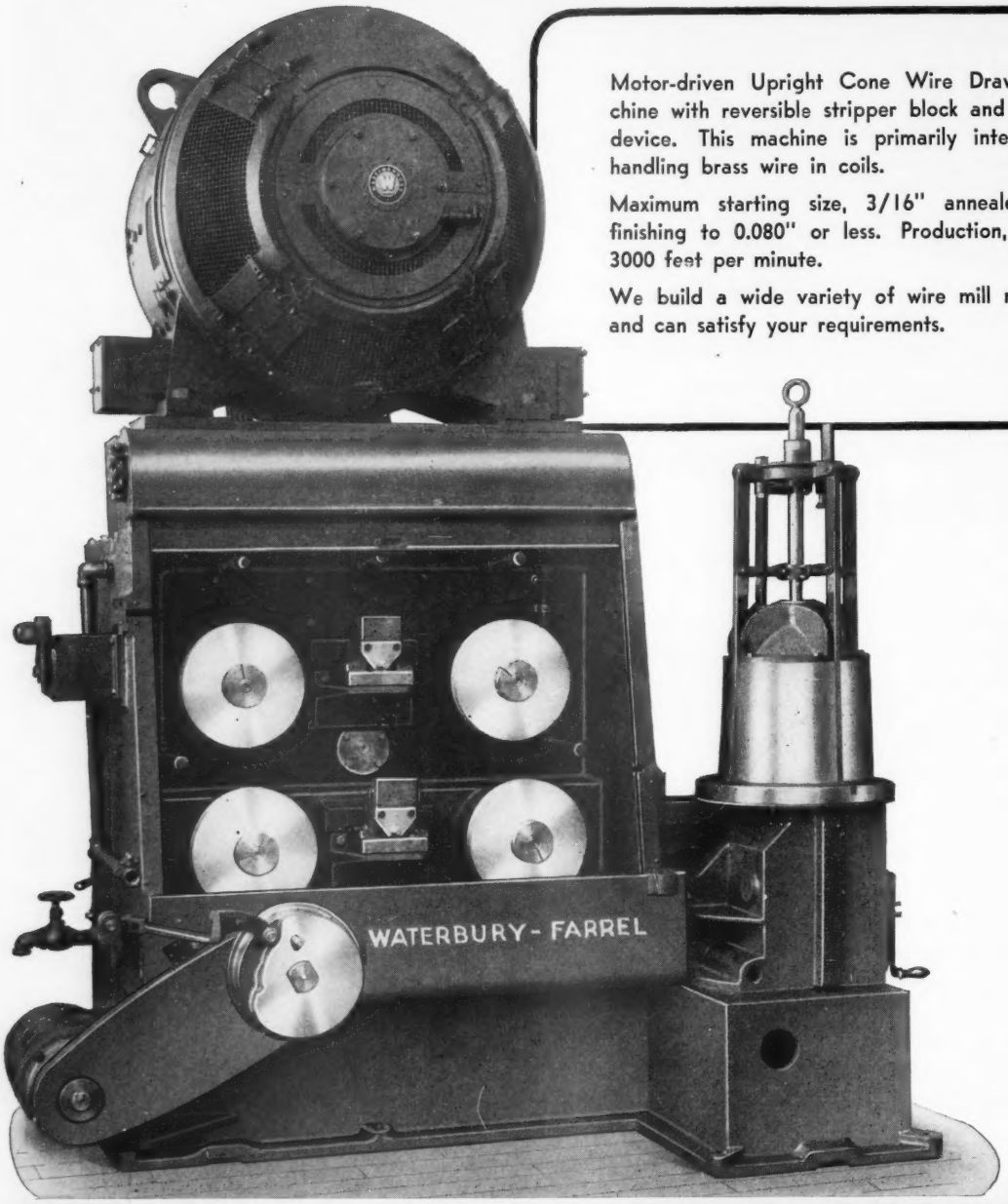
WIRE DRAWING MACHINES



Motor-driven Upright Cone Wire Drawing Machine with reversible stripper block and string-up device. This machine is primarily intended for handling brass wire in coils.

Maximum starting size, 3/16" annealed brass, finishing to 0.080" or less. Production, 1000 to 3000 feet per minute.

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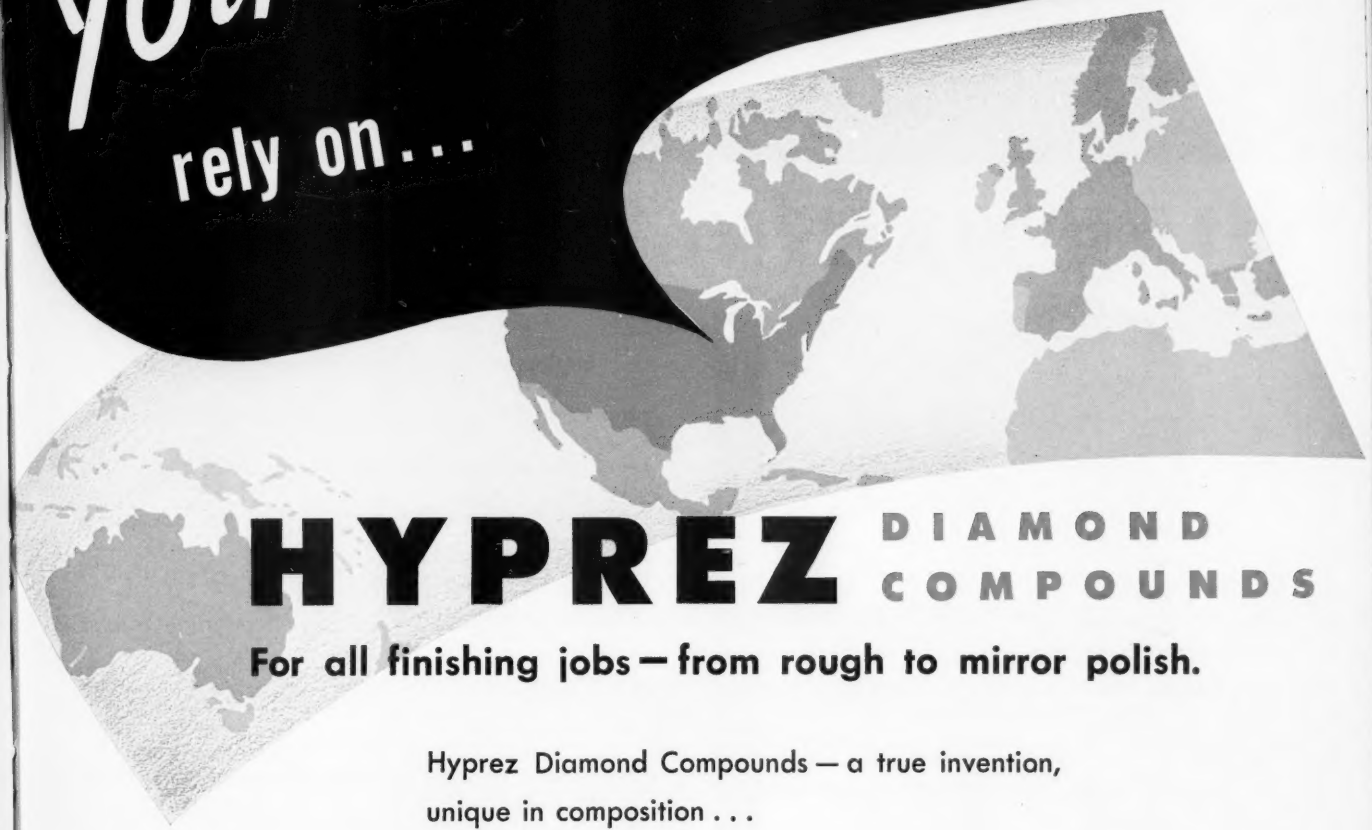

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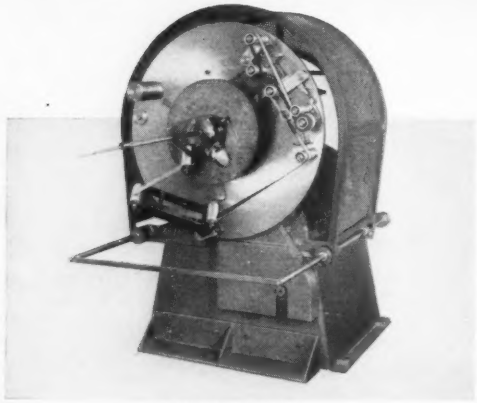
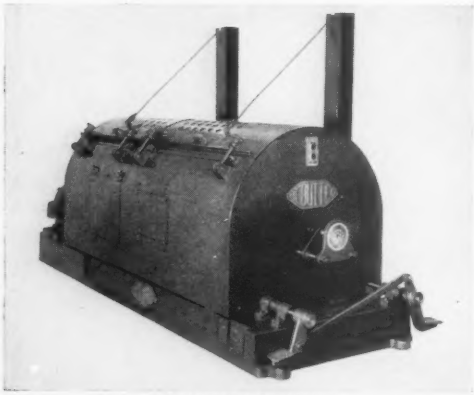


TAPING MACHINE



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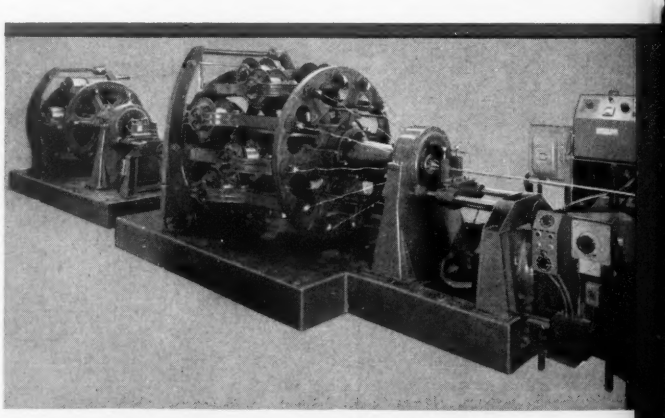
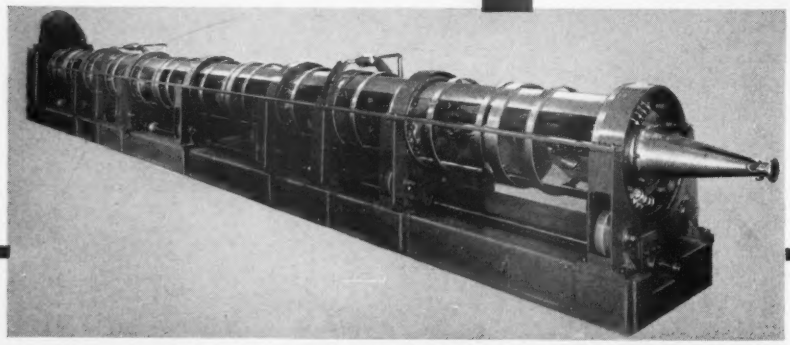


PLANETARY STRANDER



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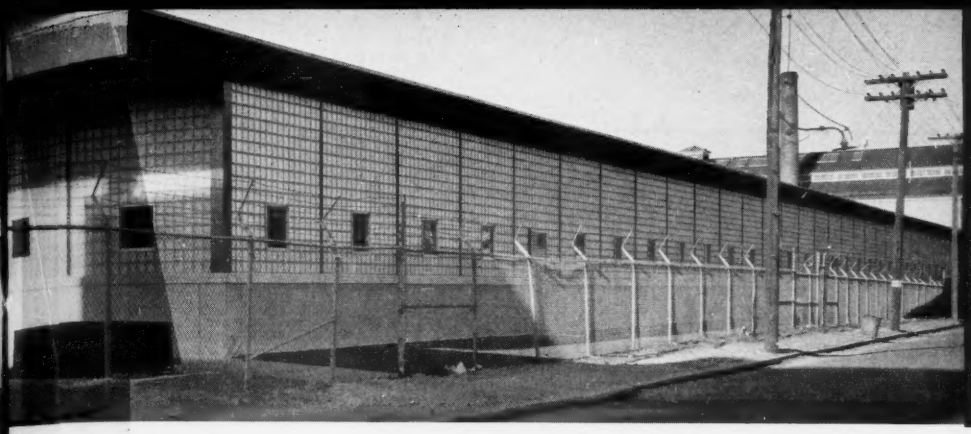

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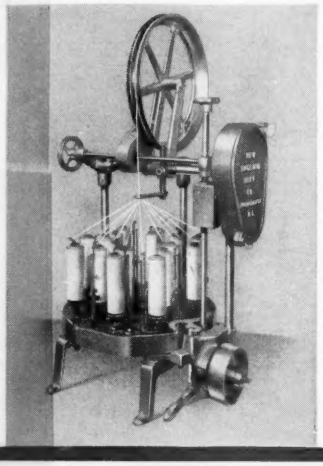
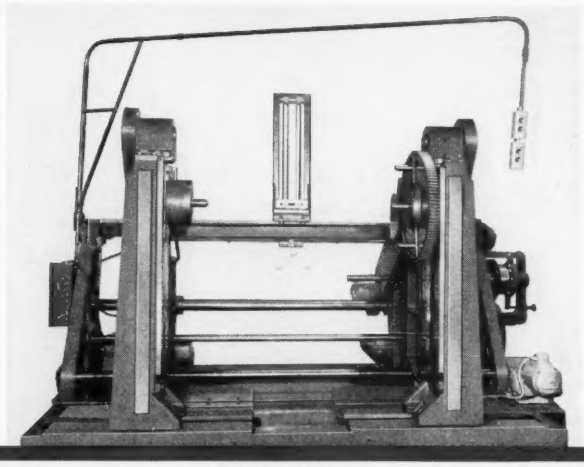
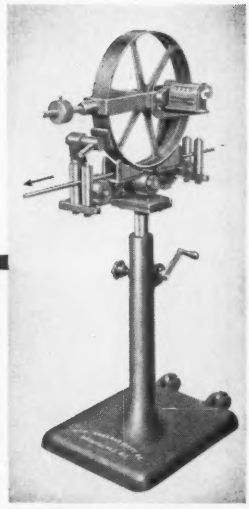


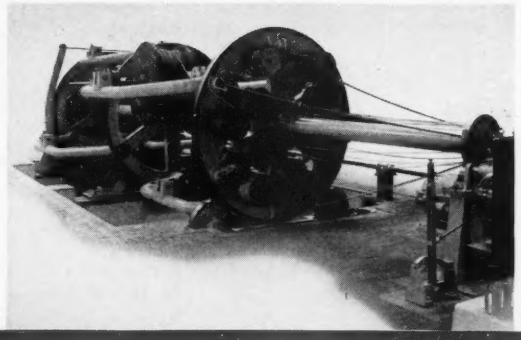
BRAIDERS



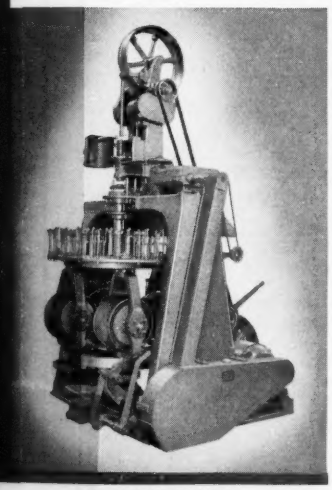
SHAFTLESS TAKE-UP



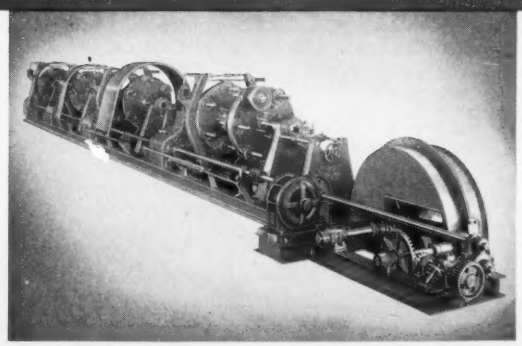
MEASURING MACHINE



CABLE CLOSING MACHINE



VERTICAL CLOSER



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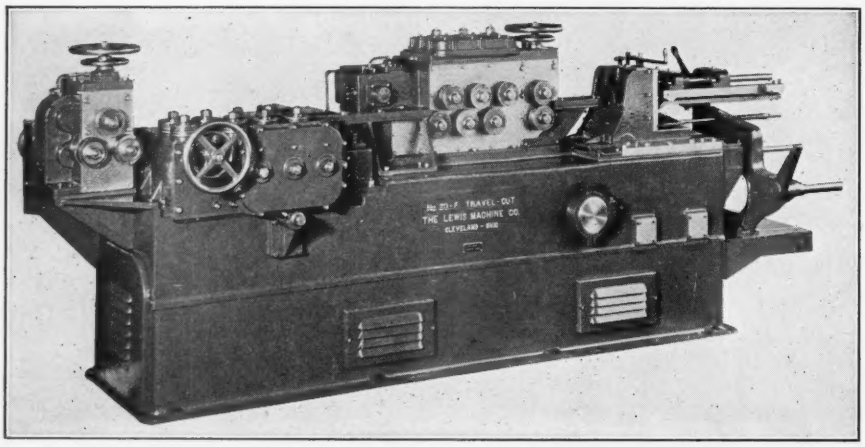

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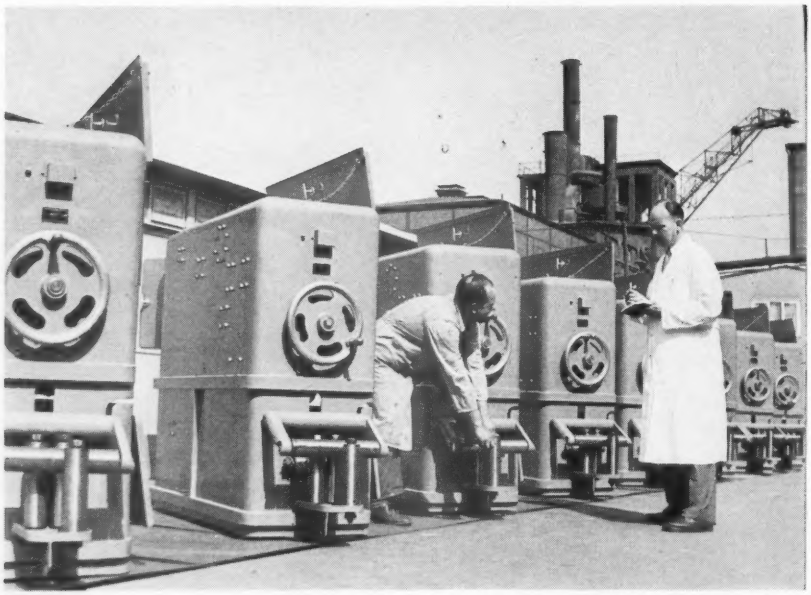

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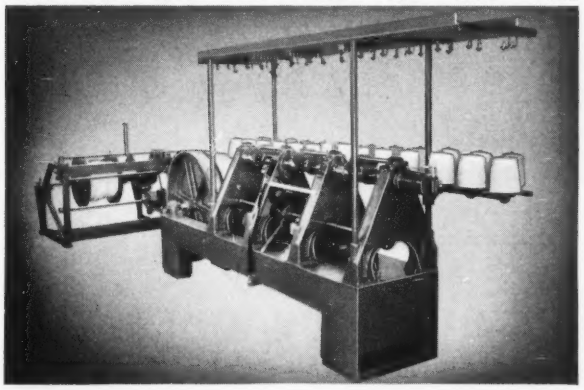
Why not prove for yourself the outstanding advantages of this amazing machine? Write today for Catalog W or visit the new show rooms at our plant.



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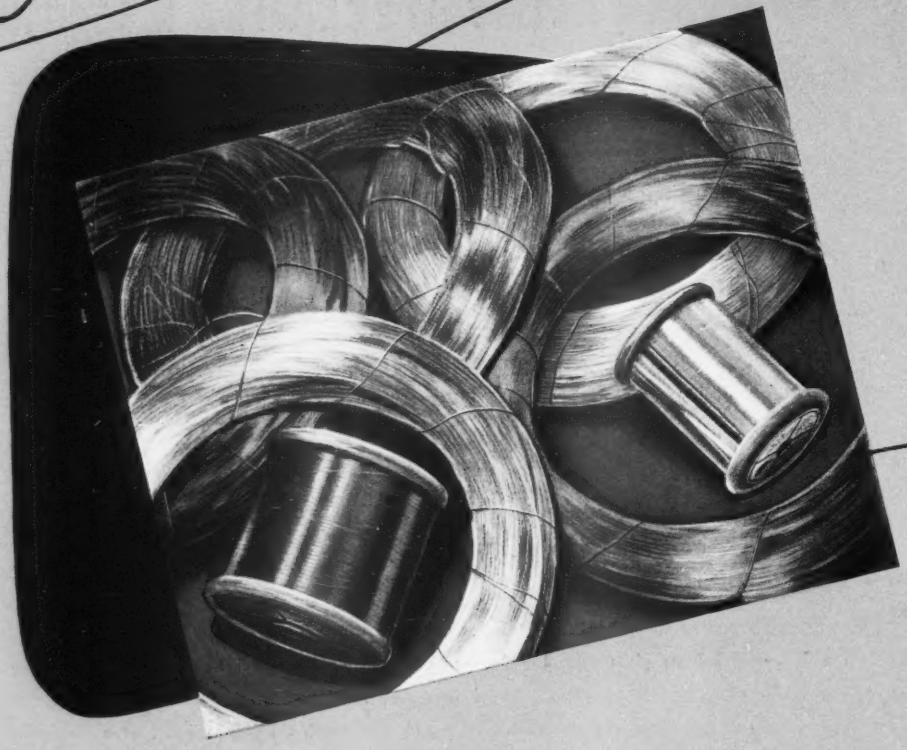

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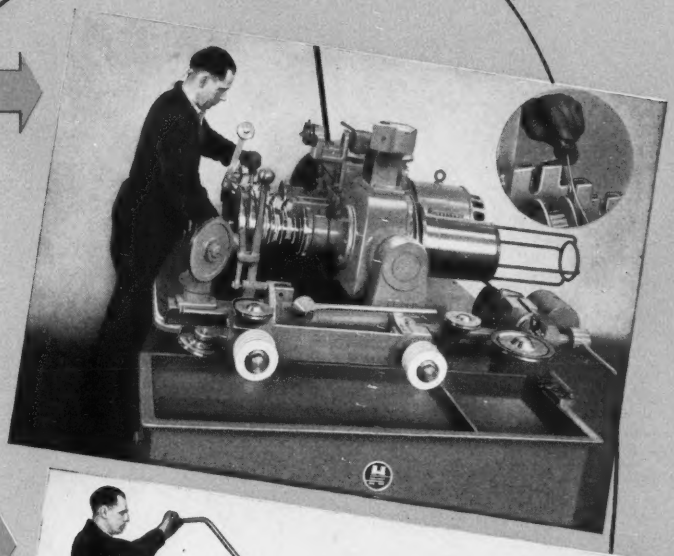
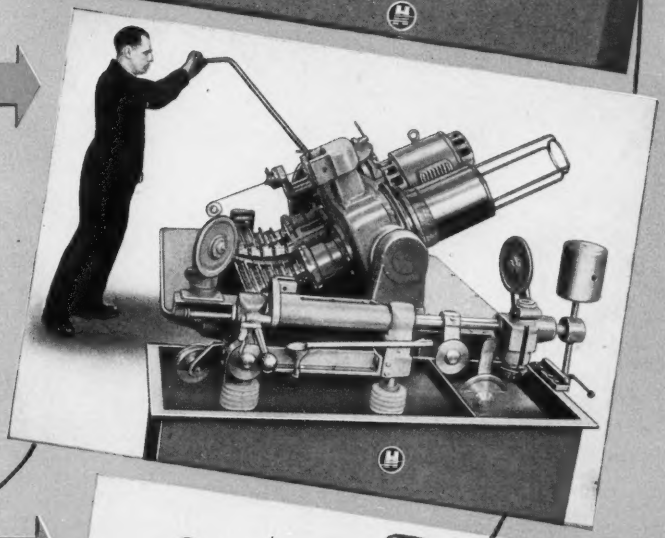


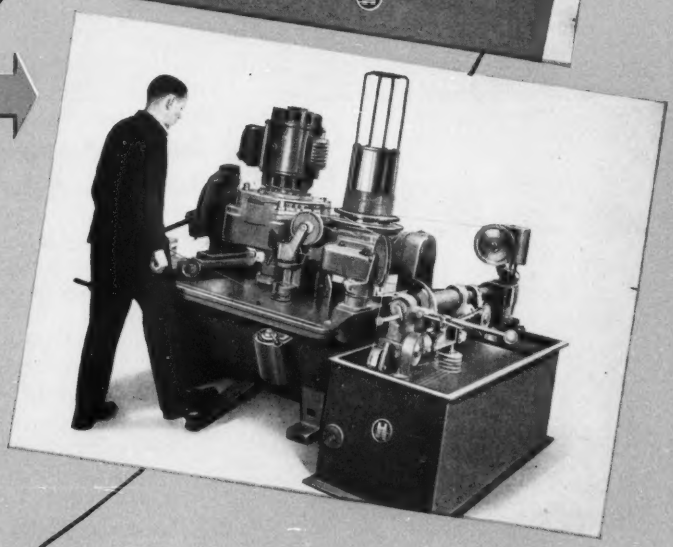
The machine in string-up position. Note how easily and comfortably all working parts of the machine (dies, drawing rings etc.) are accessible to the operator.

B)



The machine being tilted into the drawing solution. Note how carefully the machine is balanced so that it will swing on its mainshaft with practically no effort at all on the part of the operator.

C)



The machine locked into drawing position, ready to operate.

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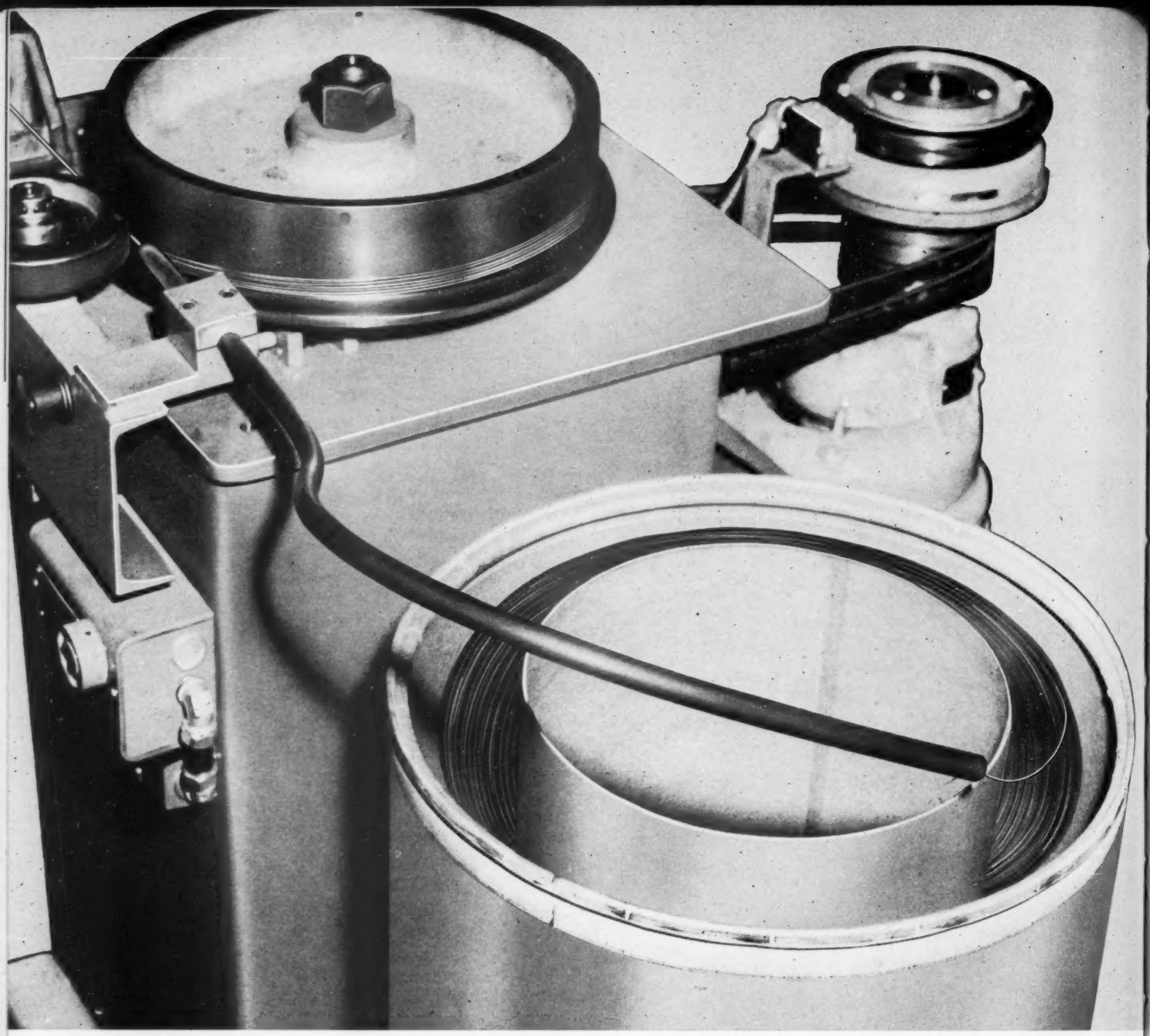

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The Wire Outlook

The wire industry is looking forward to a convention of unusual interest in Detroit, where it will celebrate the Silver Anniversary of the founding of The Wire Association. From a modest, but ambitious foundation laid in 1930, the society has grown in numbers, stature and influence to where it now has 1,100 members located in all parts of the world.

It will be with a very special pleasure that the Association officers and directors gather together in November to greet old and new members and possibly to discuss "the good old days" that have been superseded by better ones—if better products, better processes and better fabricating tools are any criteria.

A happy note is struck by improving business within and without our industry. Steel mills are recording in tangible orders the long prophesied up-turn. The copper and copper-base metal users may not fare as well, should the threatened strikes in basic production materialize and limit the supply of available copper. Otherwise, they should share in the up-turn.

Resurgent industrial activity is more than offsetting model change-over layoffs in the auto industry and it is anticipated this month that unemployment will dip under three million for the first time this year. The durable goods industries did not experience their usual summer slump and are off to a good start for the Fall months. Freight car loadings are nearing the levels of a year ago and electric power consumption is at an all-time high.

Our neighbor Canada has been enjoying somewhat improved wire and wire product shipments latterly, although total volume is still under last year. More galvanized and barbed wire, nails and staples have been delivered, with cut steel and aluminum nails and tacks a bit off.

At home, better demand for wire is noted for the final quarter for manufacturers' wire and merchant trade products. Wire rope sales are off because of heavy buying early in the year. Farm buying of wire products has held up well and nail sales have been particularly good.

While strikes seem to be spreading, they are not expected to mar the overall picture seriously. Steel contracts run into next July. The coal supply, while having only 60 day protection against strikes, is not likely to be interrupted because a strike at this time would only drive more business away from the miners.

With election just ahead, on a theme of "peace and prosperity," the government will try to keep internal and external affairs on an even keel and war scares—always present—will be played down to encourage the economy.

One of the important accomplishments of the 83rd Congress has been the re-establishment of cordial relations between Capitol Hill and the White House. As a result, important legislation that has overhauled our hodge-podge of tax laws has been effected, releasing some additional consumer purchasing power and placing our taxes on a basis that will encourage risk capital and enable business to retain more of its earnings for expansion and modernization. The elimination of a number of road blocks and shackles that were stifling business expansion has been an important contribution to our future prosperity.

So it is with a feeling of optimism and encouragement that our industry can convene in Detroit next month to discuss the new and better processes and equipment that have been developed for wire men in the last twelve months.

—from the Editor's Desk

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WIRE AND WIRE PRODUCTS

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DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 29 OCTOBER, 1954 No. 10

Continuous Patenting, Cleaning, and Coating

by Donald K. White, Foreman, No. 2 Wire Mill

John A. Roebling's Sons Corporation

Subsidiary of The Colorado Fuel and Iron Corporation

Trenton, New Jersey

With the conclusion of World War II, industry found itself gearing once again to mass produce all of the many commodities of which the luxury-starved public had been deprived during the war years. To accomplish this huge task, industry had to re-tool and re-gear its machines, and in many cases, replace its old and threadbare equipment with new, efficient, high speed machinery. With this advent of new equipment, competition among industries grew keener and every method known or that could be devised had to be installed to realize maximum economy in production.

At that time, the **John A. Roebling's Sons Corporation** decided to institute a revolutionary change in its patenting and cleaning process for steel wire as one step toward this goal. The Corporation contracted with the Drever Company of Philadelphia to fabricate one Continuous Patenting, Cleaning, and Coating Rig which was to serve as a pilot model for future rigs. Upon completion of this rig, the Corporation conducted a threefold study to investigate (a) the shortcomings and imperfections of the rig, (b) the performance of the finished product on the wire drawing machines, and (c) the size and speed of wire to be processed, resulting with a metallurgically acceptable product.

★ ★ ★

A brief resume of the past method of patenting and cleaning wire is in order so that one can more fully appreciate the value of the new installation. The diagram (see figure 1) graphically illustrates the path for the flow of materials through the Wire Mills. From No. 1 Wire Mill's Straight Line Cleaning Department a ram tractor delivered to the scheduled equipment a load of rods, each of which weighed about three hundred eighty pounds (see figure 2). The

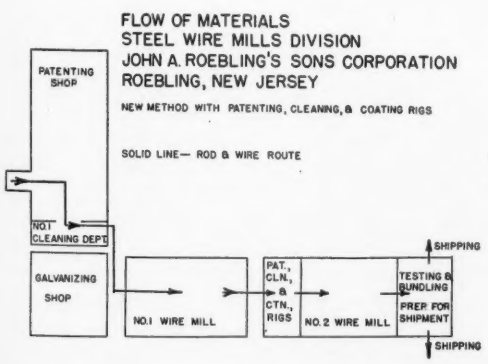


Figure 1. * * * * * * * * * * * * * * * * *

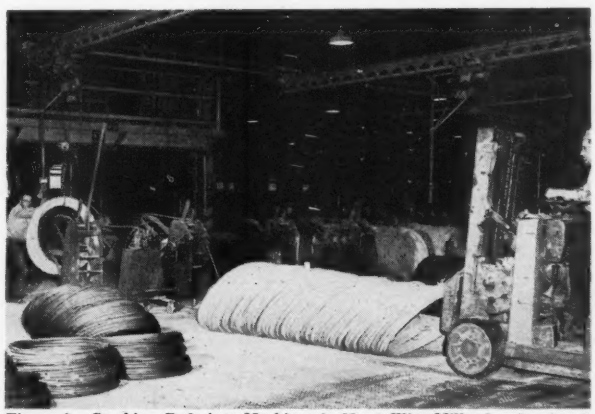


Figure 2.—Stocking Rods into Machines in No. 1 Wire Mill. * * * *

Figure 3.—Stripping 180-Pound Coils from Machine in No. 1 Wire Mill.

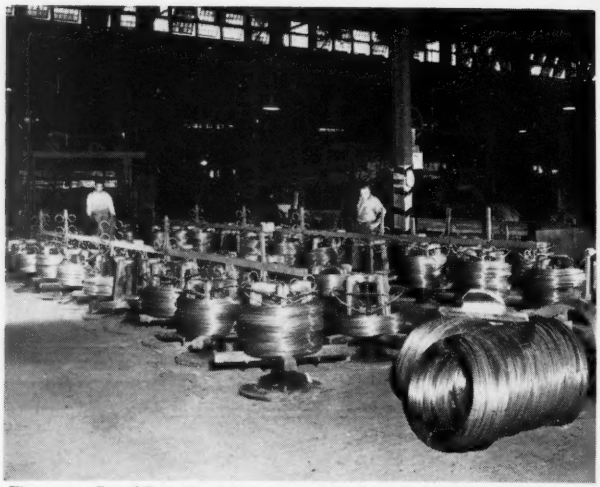


Figure 4.—Pay-Off Swifts Patenting Shop. * * * * * * * * *

rods were drawn into one hundred ninety pound coils of process wire and were loaded on a mill truck (see figure 3). The trucks were collected periodically from the machines, weighed, and delivered to the wire furnaces in the Patenting Shop. There an unloading gang unloaded each truck by hand and stored the wire near the proper furnace for patenting.

★ ★ ★

The typical rig had forty blocks and was manned by a crew of five men, consisting of two swift tenders, one furnace tender, and two block tenders. The swift tenders manually moved the coils from the storage area up to the furnace (see figure 4) and loaded them on the pay-off swifts as the preceding coils ran off. The block tenders stripped the blocks (see figure 5) when the coils were patented (see figures 6 and 7) and rolled them to the storage area.

★ ★ ★

DONALD K. WHITE

The author was born in Springfield, Mass., in April, 1926. Prior to entering grade school, he moved to Wilmington, Delaware where he lived until 1951. He graduated from Wilmington Friends School in 1944 and entered the Field Artillery branch of the Army in July of that year.

After receiving an Honorable Discharge from the Service, he entered Worcester Polytechnic Institute in Worcester, Mass., where he studied Mechanical Engineering. In June 1951, he received his Bachelor of Science degree in Mechanical Engineering.

He joined the John A. Roebling's Sons Corporation in the capacity of a Foreman in the Steel Wire Mills Division in July, 1951.

This paper was prepared for presentation at the Annual Convention of The Wire Association in Detroit on November 9, 1954.

Figure 5.—Stripping a Block on Patenting Rig Patenting Shop. * * * * * *

A loading gang, consisting of six men, manually loaded the coils on narrow gage railroad cars, forming a series of loads which average five thousand pounds. Upon completion, an engine driver hooked the series together and moved it to No. 2 Wire Mill's Cleaning House.

★ ★ ★

In No. 2 Cleaning House, a gang dumped the wire on the floor and rolled the coils by hand to a stand to form a frame for cleaning. Each floor had a gang of three men, consisting of a hooker and two loaders. The hooker cleaned the wire by processing the frame through the acid, water, and borax and placed the frame so the loaders could unload it on a mill truck. The loaded trucks were pulled into No. 2 Wire Mill and were delivered to the scheduled machine by the stock crew, which consisted of one tractor driver and one tractor follower.

★ ★ ★

With the new system, the flow of materials through the Wire Mills is accomplished with less lost motion. The path of the materials is graphically illustrated in the diagram (see figure 8). The wire is first processed in No. 1 Wire Mill in the same manner that was employed with the past system. The wire drawer then draws the three-hundred-eighty-pound rods on collapsible strippers to produce one thousand-pound coils (see figure 9). Upon completion, the strippers are placed on pallets, each of which holds four strippers. A fork

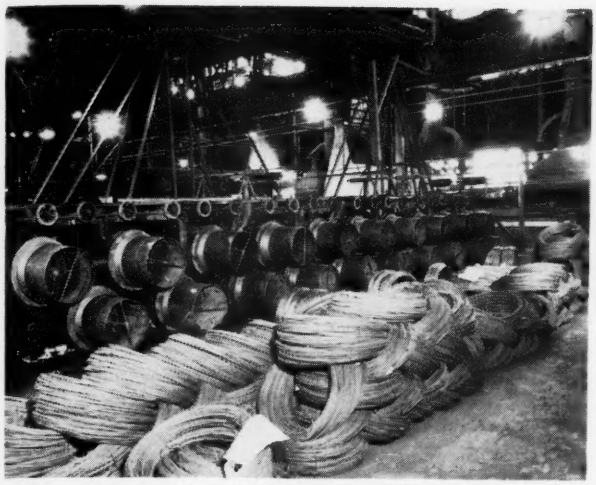


Figure 6.—View of Take-Up Blocks in Patenting Shop. * * * * *

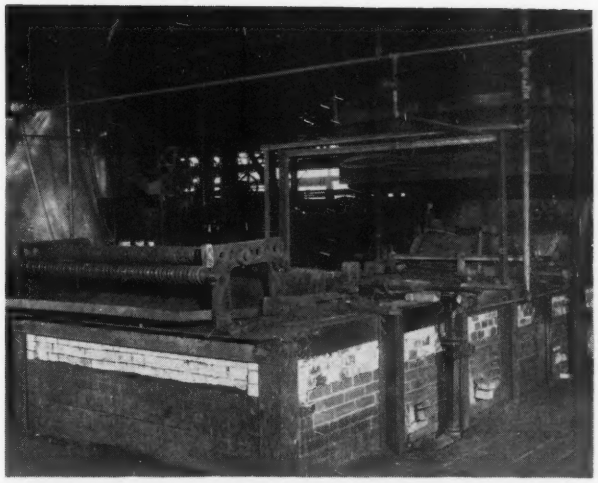


Figure 7.—Lead Bath of Patenting Rig Patenting Shop. * * * * *

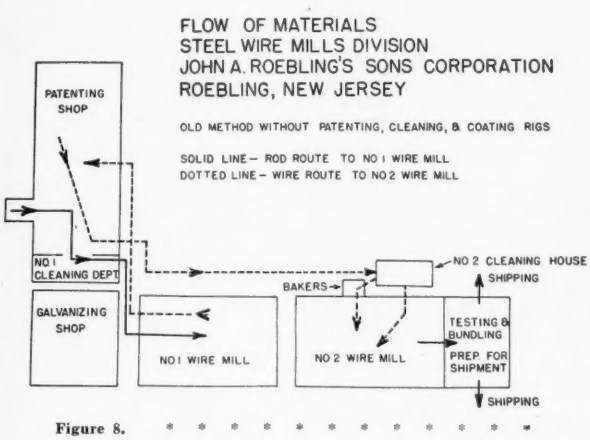

FLOW OF MATERIALS
STEEL WIRE MILLS DIVISION
JOHN A. ROEBLING'S SONS CORPORATION
ROEBLING, NEW JERSEY
OLD METHOD WITHOUT PATENTING, CLEANING, & COATING RIGS
SOLID LINE – ROD ROUTE TO NO 1 WIRE MILL
DOTTED LINE – WIRE ROUTE TO NO 2 WIRE MILL
PATENTING SHOP
NO 1 CLEANING DEPT
GALVANIZING SHOP
NO 1 WIRE MILL
BAKERS
NO 2 CLEANING HOUSE
SHIPPING
NO 2 WIRE MILL
TESTING & BUNDLING
PREP. FOR SHIPMENT
SHIPPING

Figure 8. * * * * * * * * * * * * *

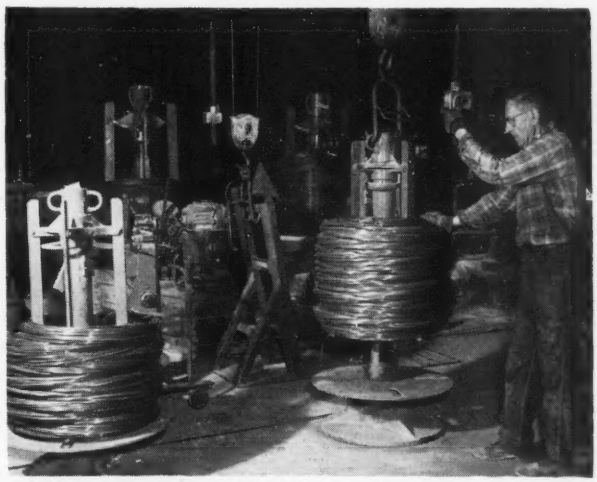


Figure 9.—Stripping 1,000-Pound Coil No. 1 Wire Mill. * * * *

tractor driver (see figure 10) picks up the pallets, weighs and delivers them to the new rig. The riding strippers are set on the pay-off swifts so that the wire may be patented, cleaned, and coated through the rig by the two-man crew. One-thousand-pound coils are stripped from the blocks and are stored in the area in front of the rig. Periodically, the wire is moved into the scheduled machines (see figure 11) by a ram tractor driver.

★ ★ ★

The furnace is designed to patent, clean, and coat three thousand pounds of .112″ diameter bright wire per hour. For smaller sizes, the production is proportionately less; whereas, for larger sizes the production is somewhat more.

★ ★ ★

A direct comparison of a standard size, .095″ diameter wire, will help in evaluating the advantages of the new rig compared with the past method. Under the old method, the expected production for a five-man crew on the patenting furnace would be about 2,200 pounds per hour. A three-man crew in No. 2 Cleaning House would clean and coat about 11,500 pounds per hour, or in other words, .57 men would clean 2,200 pounds per hour. That means that 5.57, or about 6 men, were required to patent, clean, and coat 2,200 pounds per hour. Reducing the figure to a common denomina-

Figure 10.—Weighing and Moving Palletized Load of 1,000-Pound Coils No. 1 Wire Mill.

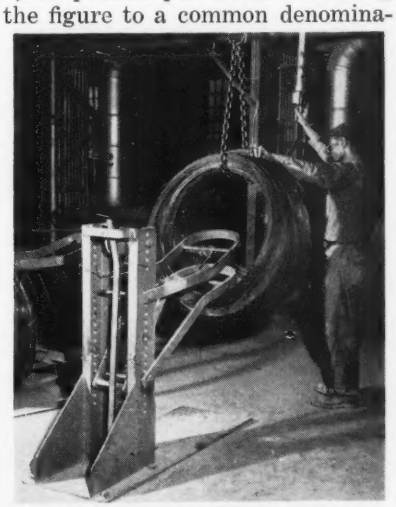


Figure 11.—Loading 1,000-Pound Coil on Pay-Off Flipper No. 2 Wire Mill. * * * *

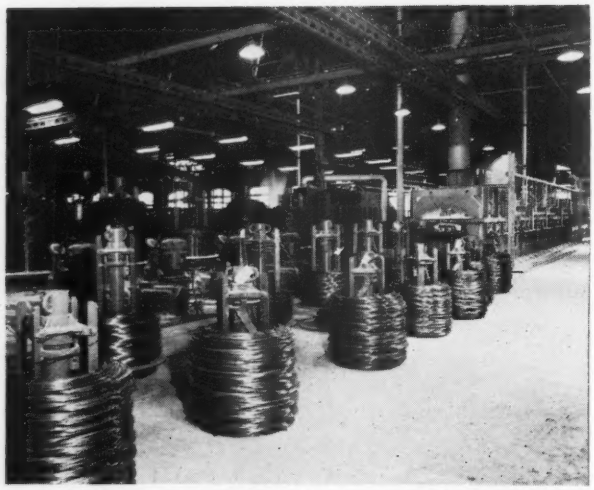


Figure 12.—Pay-Off Swifts and Take-Up Blocks No. 1 Continuous Patenting, Cleaning and Coating Rig. * * * * * * * * * * * *

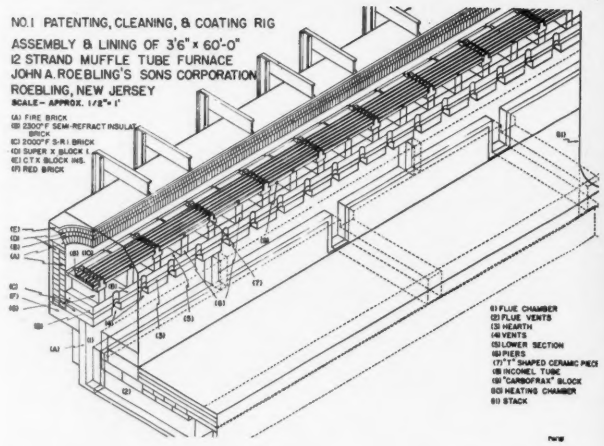


Figure 13.—Sectional Isometric Sketch of No. 1 Continuous Patenting, Cleaning, and Coating Rig. * * * * * * * * * * * *

tor, about 400 pounds would be produced per man per hour. With the new rig, two men will patent, clean, and coat 2,480 pounds per hour, or reducing the figure, 1,240 pounds per man per hour. Bear in mind, this comparison, does not take into consideration the manpower required to move and handle the wire by the past method. That item, in itself, will be a substantial savings.

★ ★ ★

The collapsible riding strippers are set on low pay-off swifts (see figure 12). These swifts are designed so that the strippers can be set on the swifts and held stationary with respect to the swift while it is paying off. Each swift has a variable tension brake band around the shaft to control the tension of the wire paying off from the stripper.

★ ★ ★

A series of wire guide stands are placed along the line of swifts to guide the wire into the furnace.

★ ★ ★

The furnace (see figure 13) is a Drever gas-fired, twelve strand, muffle tube, heating furnace designed for a maximum temperature of 2,000 degrees Fahrenheit. The furnace shell is constructed with three-sixteenth and one-quarter inch steel plate framed in structural shapes. Internally, the sides of the furnace are constructed with three layers of semi-refractory insulating bricks which are from the outside in; two and one-half inches of Johns-Manville's "Super X" block insulation, four and one-half inches of two thousand degree Fahrenheit brick, and four and one-half inches of twenty-three hundred degree Fahrenheit brick. The top is arched and is constructed with four layers of insulating material which are from the inside out: four and one-half inches of fire brick, two and one-half inches of twenty-three hundred degree Fahrenheit brick, two and one-half inches of Johns-Manville's "Super X" block insulation, and one inch of "CTX" block insulation, which is a material made of magnesium carbonate. The top was erected separately and was set into position over the base of the furnace after its construction. This feature provides the unit with the versatility to make internal repairs without destroying an excessively large area of brickwork, and reduces the time lost while repairs are being made.

★ ★ ★

The flue chamber extends the entire length of the furnace under the hearth and is connected to the external flue by a series of five vents spaced the length of the furnace. All of the chambers are lined with four and one-half inches of firebrick. The hearth of the furnace is made up with three different layers of semi-refractory insulating brick. The lower section of the furnace is connected to the flue by a series of vents through the hearth floor. Starting from the flue chamber, the hearth is constructed with four and one-half inches of firebrick, two and one-half inches of two thousand degree Fahrenheit brick, and four and one-half inches of twenty-three hundred degree Fahrenheit brick. On the hearth floor a series of piers, four and one-half inches wide, are constructed. On top of each alternate pier is an inverted "T"-shaped ceramic piece with twelve scallops spaced the length of the pier, into which the inconel muffle tubes are placed. "Carbofrax" blocks, supported by the piers, are placed across the width of the furnace and are vented to the lower section to permit the passage of the gases. These blocks help to retain the heat in the heating chamber and to support the tubes.

★ ★ ★

The furnace is side-fired (see figure 14), and the burners are placed on both sides of the furnace above the hearth line and are fired tangentially to the furnace arch. Standard city gas is used for the fuel in the furnace. The furnace is divided into five independently operated zones, and each is equipped with three or four pairs of burners so divided to have a total of eighteen pairs of burners among the five zones.

★ ★ ★

The excess gases pass into the flue ducts, and all the ducts lead to a twenty-four inch, steel-encased, firebrick-lined stack which is vented through the roof of the mill.

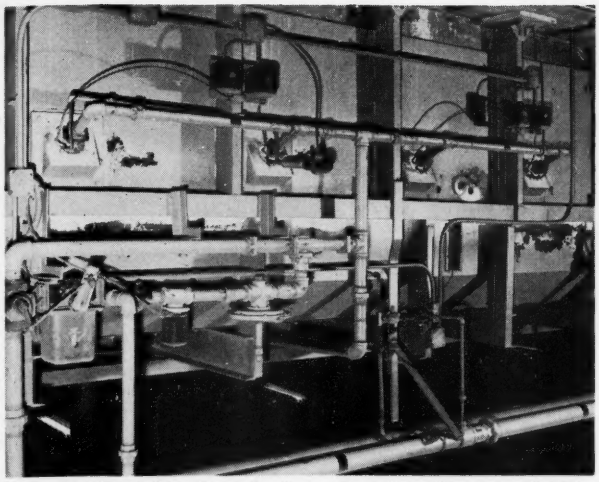


Figure 14.—No. 4 Zone No. 1 Continuous Patenting, Cleaning, and Coating Rig.

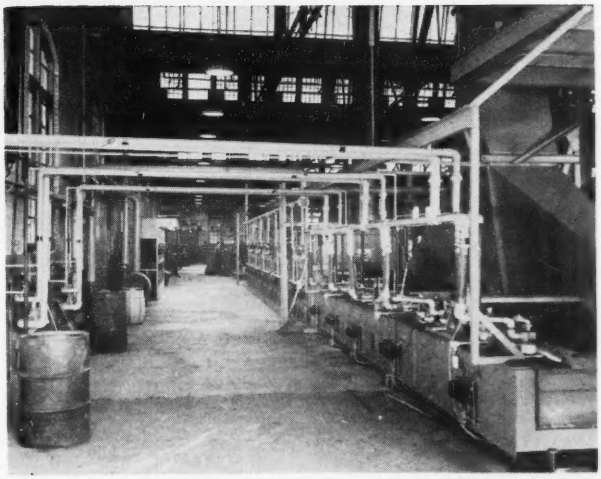


Figure 15.—Lead Bath No. 1 Continuous Patenting, Cleaning, and Coating Rig.

Each zone is controlled automatically by means of a thermocouple connected to a Leeds and Northrup control unit. The latter serves to regulate a valve that governs the amount of air admitted to the burners in the zone. The air is mixed with the gas in a venturi mixer and is subsequently piped to each burner. By the nature of the venturi mixer, a variation in the quantity of air flowing will reflect a similar variation in the amount of gas consumed. Each zone of the furnace can be manually operated from the control board.

★ ★ ★

The gas line to each zone is equipped with a Minneapolis-Honeywell combustion safeguard, called a "Protectoglo" unit. This device prevents the gas from entering the mixing chamber unless the pilot for each burner is ignited.

★ ★ ★

The pilot connected to each burner is fed with an air-gas mixture from a smaller mixing valve. It is ignited by a spark plug connected to the automatic controls, which will apply the spark at the proper time. Each pilot is equipped with a flame rectifier, and it is this device that prevents the zone's main gas valve from opening when the pilots are not functioning properly.

★ ★ ★

The air used for combustion is supplied from a blower connected to the out-of-doors.

★ ★ ★

A series of silicon carbide shoes are placed at the exit end of the tubes for the wire to ride over as it leaves the furnace. The shoes reduce excessive wearing of the tubes.

★ ★ ★

The lead bath (see figure 15) is a Drever, gas-fired, immersion tube heated, lead quenching bath and is located immediately next to and in line with the furnace. The pan is constructed from one inch thick steel plate; is thirty feet long, four feet wide, sixteen inches deep; and is contained in a one-eighth inch steel plate shell, reinforced and braced with structural shapes, and insulated on all four sides and bottom with six inches of asbestos. The whole bath rests on three six inch "I" beams. The bath is fired by ten immersion-type, hairpin-shaped burners. The elements are constructed from five inch steel tubes, and when in

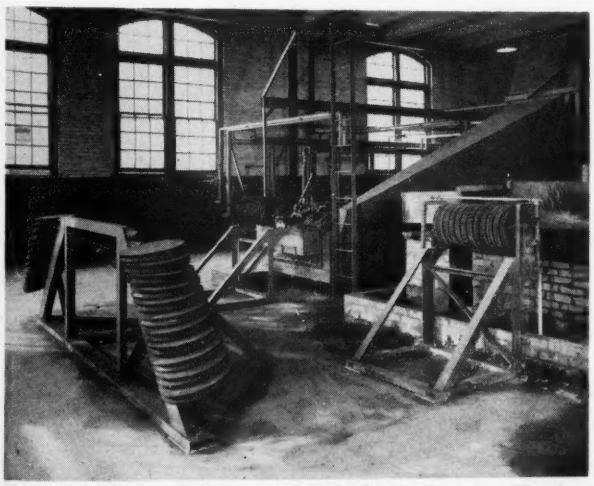


Figure 16.—Turn Around No. 1 and 2 Continuous Patenting, Cleaning, and Coating Rig.

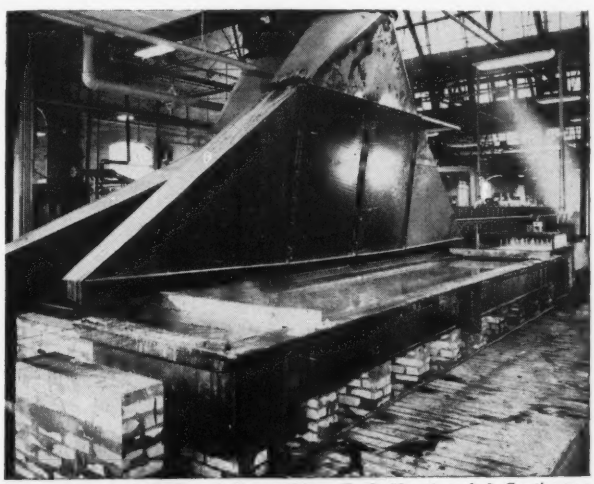


Figure 17.—Acid Bath and Spray Rinse Tank No. 1 and 2 Continuous Patenting, Cleaning, and Coating Rig.

place, extend down one side and across the bottom of the bath. The fuel mixture is fed into one end of the burner and is ignited by a pilot in the open end. The combustion occurs in the elements under the lead.

★ ★ ★

The control arrangement is similar to that of the furnace. The bath is divided into three zones which are controlled by the controls and thermocouples. The bath is equipped with a valve arrangement to heat or cool the bath. The controlled air supply for each zone branches off into two lines, one leading to the secondary air connections at the immersion tubes, and the other leading to the proportional mixer. The proportional mixer is adjusted to supply the burners with a very rich air-gas mixture. The mixture is leaned out with the secondary air at the burner. The control valve is so arranged that the gas will shut off when the pan is overheated to permit cooling of the bath by the flow of air through the tubes.

★ ★ ★

The bath is equipped with an exhaust system to remove all the lead fumes. The intake opening is along the edge of the pan and the fumes are exhausted by a fan located in the stack. The unit is electrically connected to the other controls of the rig, so that if a failure of the lead bath exhaust system should occur, the entire rig will cease operating.

At this point in the rig's layout, two sets of sheaves (see figure 16) are located to reverse the wire course. The sheaves are constructed with high temperature, lifetime bearings and are covered with plates to prevent the wire from jumping out of the grooves of the sheaves, in the event of a slack wire.

★ ★ ★

The acid pickle tank, the hot water rinse tank, and the borax coating tank are set up on piers built in a common basin. The piers and basin are constructed with acid-resistant brick mortared with "Basolite", which is an acid-resistant, resin-bonded cement.

★ ★ ★

The acid tank (see figure 17) is constructed of rubber covered steel, lined with acid-resistant brick, and is fifteen and one-half feet long, three and one-half feet wide, and ten inches deep. The wire enters and leaves the pan by passing over silicon carbide blocks and is held submerged in acid by two silicon carbide sinkers. The tank is equipped with an overflow pipe to eliminate the possibility of flooding the tank.

★ ★ ★

The hot water spray rinse tank consists of three series of five spray nozzles. The temperature of the water is maintained by means of a thermally controlled mixing valve connected to the water and steam lines.

★ ★ ★

The borax coating tank (see figure 18) consists of an upper and lower tank, forming a double tank arrangement. The solution is conveyed from the lower tank into the upper tank by means of an agitator pump. The upper tank is forty-two inches wide and seven feet long, whereas the lower tank is of the same width, but is eight feet long. At the exit end of the pan is a series of wipes which remove excess borax solution from the wire.

★ ★ ★

The level of solution in the tank is maintained by an electrically controlled regulator which controls a valve in the water line that continually adds water to compensate for the loss of coating solution dragged out on the wire.

★ ★ ★

Between the borax coating tank and the take-up blocks is located the dryer (see figure 19). The dryer is heated by flue gases which are removed from the flue by means of a motor-driven blower.

★ ★ ★

The take-up blocks consist of twelve separate Vaughn, thirty inch diameter, D.C. motor-driven push-up blocks. The blocks are equipped with collapsible riding strippers. The push-up feature of these blocks keeps the heavy load moving up the block instead of bunching around the bottom.

★ ★ ★

The blocks are equipped with a switch to reduce the normal operating speed to the base speed of

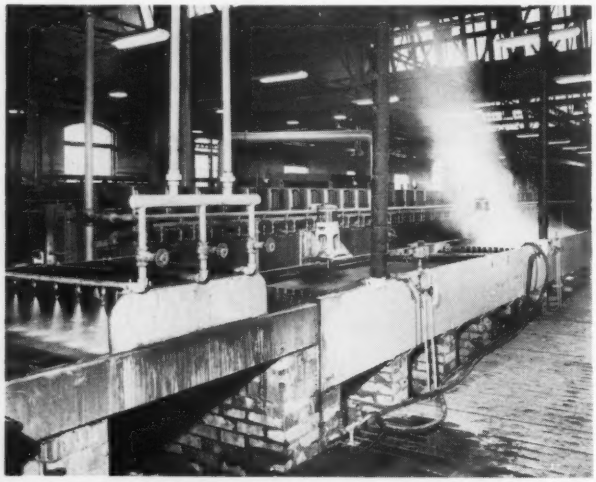


Figure 18.—Spray Rinse Tank and Borax Coating Tank Continuous Patenting, Cleaning and Coating Rig.

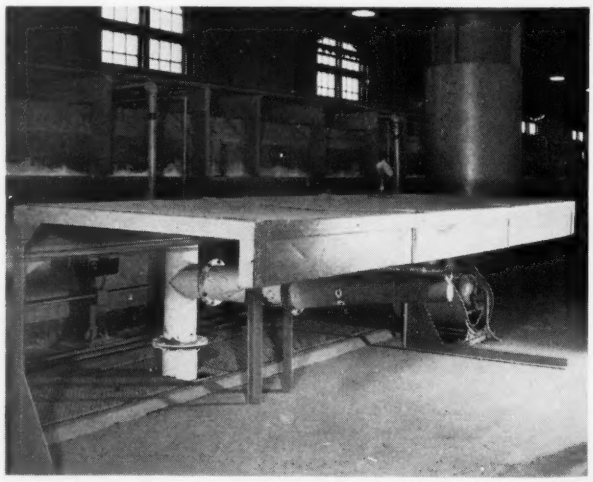


Figure 19.—Hot Air Dryer No. 1 Continuous Patenting, Cleaning, and Coating Rig.

Figure 20.—Storage of Stock and Finished Wire No. 1 Continuous Patenting, Cleaning, and Coating Rig. * * * * * * * * * * *

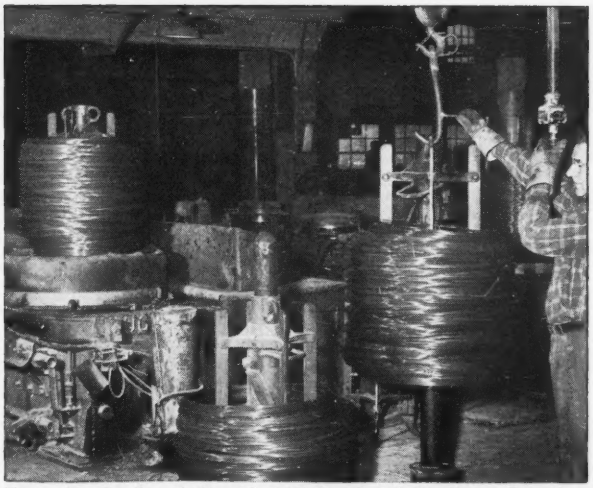


Figure 21.—Loading Swift with 1,000-Pound Coil Continuous Patenting, Cleaning, and Coating Rig. * * * * * * * * * * * *

fifty-four feet per minute to allow the operators to strip the blocks or weld a new coil. Each block has a control to vary the normal block speed, depending upon the size of the wire being processed.

★ ★ ★

The operation of the rig is conducted in a manner generally similar to that of other rigs. The wire is stored in the furnace area (see figure 20) by heats on pallets. When the specific heat is scheduled, an operator moves a stripper (see figure 21) by means of an electric hoist to the pay-off swift that is running out of wire. In the meantime, the other operator transfers the last few pounds of the preceding coil to a pay-off flipper which enables him to butt weld the back end of the coil to the front end of the next one and properly dress the weld. While performing this operation, the last few pounds of the original coil has payed off and the new coil is ready to be set into motion. As the other coils run off, the same operation is repeated with the welder-flipper unit being moved to the pay-off swift being replenished.

★ ★ ★

The wire moves through the furnace in twelve separate muffle tubes and passes out of the furnace into the lead quenching bath. There the wire is quenched to secure the required physical properties. It then passes through the sulphuric acid pickling tank, through the hot water spray tank, and through the borax coating pan. Next, the wire passes through the hot air dryer to dry the coat on the wire, and finally, the wire is taken up on the twelve Vaughn take-up blocks.

★ ★ ★

Since the time when the rig was initially put into operation, the muffle tubes proved to be a perplexing problem. The purpose of using tubes is to prevent direct impingement of the flame on the wire, to encase the wire in an atmosphere to reduce scale formation while it passes through the furnace, and to produce a uniform product. After a few weeks of operation it became apparent that the tubes would plug up with a hard porous deposit. The cleaning of the tubes by the crew can prove to be a long, laborious task, with the production curtailed by the number of hours lost by cleaning. The serious nature of the tube problem can readily be realized, because for every tube rendered inoperative by plugging, the production is curtailed by 8.34 per cent. Investigation by the Research and Development Group revealed by chemical analysis that the deposit in the tubes was composed of lime, borax, iron, iron oxide, and nickel. This research correlated the deposit in the tubes with the coating used for ripping the wire. The high borax concentration seemed to be the agent causing the hardness of the deposit.

★ ★ ★

Since sull-finished, borax coated rods were used mostly in ripping the stock for the rig, it was decided to try lime coated rods. The subsequent formation in the tubes proved to be a powdery deposit which could be comparatively easily removed by cleaning. Difficulties were experienced in drawing the finished wire and it was believed that as the wire went through the sulphuric acid pan, the lime reacted to form calcium sulfate, an insoluble, highly abrasive material which was not removed from the wire during the cleaning operation. The ultimate result meant shortened die life while drawing this wire and the inability to operate the machines at the proper speeds. It was then decided to use sull coated rods, but to clean the tube at more frequent, regular intervals.

★ ★ ★

Three methods have been devised for cleaning the tubes: (a) blowing them out with compressed air, (b) running a rod through them to loosen the plugging agent, and (c) reaming them out with an air drill. The first two methods can be performed when the tubes are hot, but the third has to be done when the tubes are cool. If the reaming is done in hot tubes, the risk of rupturing one is greater.

★ ★ ★

Another tube difficulty that became obvious after extended operation of the furnace, and one far more serious in nature, is the intercrystalline failure of the nickel in the tubes. This is a result of

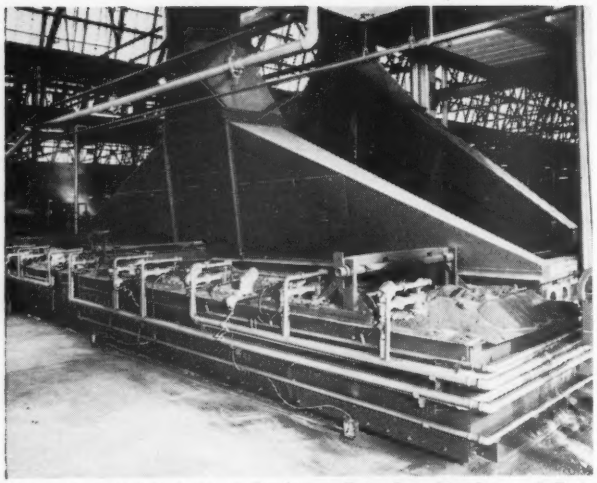


Figure 22.—Lead Bath No. 2 Continuous Patenting, Cleaning, and Coating Rig.

contamination of the nickel with the lead under high temperature, which is presumedly in the fumes that flow back into the furnace from the lead bath, in the event of a broken wire. This phenomenon results in tube ruptures which can only be corrected by the installation of a new tube or tube section. Since tubes are expensive and difficult to procure, it is a costly and time-consuming operation to replace them.

★ ★ ★

The tube problem became so acute that the next furnace installation was designed without them, and this furnace is discussed in a later portion of this article.

★ ★ ★

After leaving the furnace the wire passes into the lead bath (see figure 22). Generally, the bath is operated at a temperature of between one thousand and eleven hundred fifty degrees Fahrenheit, depending upon the percentage of carbon in the wire being processed and the tensile strength desired. The lead is blanketed with a layer of vermiculite, which is a material used to prevent excessive oxidation of the lead and loss of heat from the pan. The lead is removed from the wire at the exit end of the bath by a wipe which is composed of steel scale or some other similar material. Three sinkers spaced along the lead bath retain the wire under the lead.

★ ★ ★

After the wire leaves the lead bath, it passes through the sulphuric acid pickling tank. Under normal operating conditions. the acid concentration is maintained from fifteen to twenty percent acid by volume and is heated between one hundred seventy and one hundred eighty degrees Fahrenheit. The concentration of the acid in the tank is maintained by additions from an electrically driven metering pump connected to the acid line.

★ ★ ★

The acid consumption of this equipment reveals a definite saving when compared with the other departments cleaning wire. An average figure of 12.65 pounds of acid for a ton of wire processed on the rig is not uncommon, whereas the Straight Line Cleaning Department, the only other cleaning department using sulphuric acid, used about twenty-five pounds of acid per ton of wire. Since the acid consumption is reduced on the new rig, substantial savings are realized by the Corporation.

★ ★ ★

As was explained previously, the wire leaves the acid tank, passing over a silicon carbide block which is used to prevent damaging the tank and also serves as a wipe to remove the excess acid, thereby reducing the amount of acid dragged out from the tank.

★ ★ ★

Make-up water is continually added to maintain the proper level and concentration of acid in the tank.

★ ★ ★

The wire passes next into the water rinse tank to be washed by means of a hot water spray. The temperature of the water is maintained by means of a thermally controlled mixing valve connected to the water and the steam lines.

★ ★ ★

Next, the wire is coated in the borax tank. The wire passes through weirs in the upper tank into the solution. The level of the solution in the upper tank is above the normal wire line path. The solution flows out the ends of the tank through the weirs into the lower tank. The solution is recirculated by means of a pump which draws it from the lower tank into the upper tank.

★ ★ ★

The borax solution is maintained at a concentration of between fifteen to twenty ounces per gallon. The temperature of the solution is maintained between one hundred ninety to two hundred degrees Fahrenheit and is heated by steam flowing in a coil at the bottom of the upper pan, and the temperature is regulated by a thermal control valve.

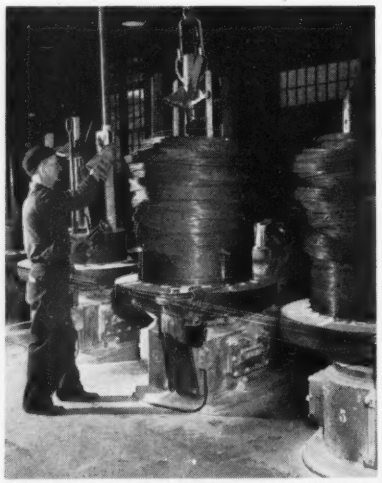


Figure 23.—Stripping 1,000-Pound Coil from Take-up Block Continuous Patenting, Cleaning, and Coating Rig.

The wire now passes through a hot air dryer to dry the coat on the wire and finally the wire is taken up on the twelve Vaughn take-up blocks. They are stripped periodically by the operators (see figure 23) and each coil is banded

and moved to the storage area by means of an electric hoist.

★ ★ ★

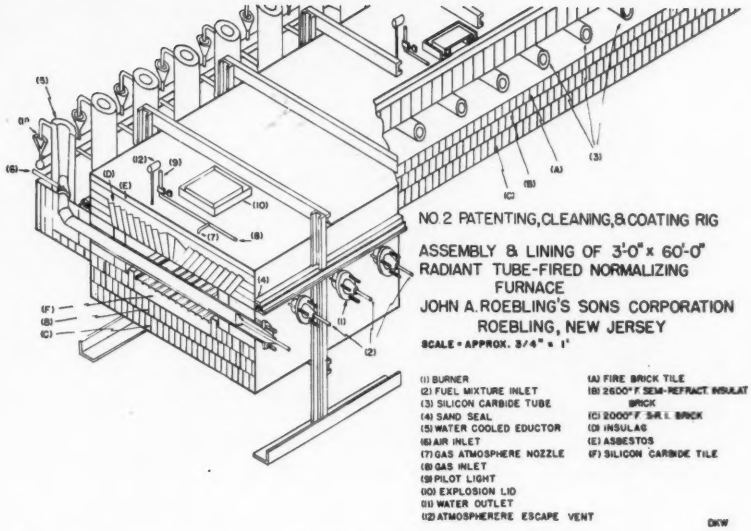
The furnace is manned by a crew of two men, which is one crew of four that service the equipment around the clock twenty-one turns a week. The men are supervised by the shift foreman. They are required to operate the rig with its many ramifications and perform other miscellaneous duties, some of which are: testing the acid and borax solutions, making the necessary solution additions, adding lead, fixing lead blanket, dressing lead wipe, and performing tensile tests to insure that the wire being processed will meet specifications.

★ ★ ★

The shift foreman observes the tensile test reports and adjusts the normal speed of the blocks, sets the temperature of the lead pan and the furnace when a change is required, checks the acid-borax reports and, if the need be, orders the necessary changes, periodically checks the furnace, auxiliary equipment, and panel board, changes daily the temperature charts, checks the temperature of the wire leaving the furnace, and generally observes the performance of the operators to insure that they are operating the rig under the conditions prescribed to produce a quality product.

★ ★ ★

After installation, the Research and Development Group conducted an extensive series of tests to determine the optimum operating characteristics of the furnace to produce a uniform, metallurgically acceptable product. It was determined that the furnace would have to be operated at the maximum temperature in order to meet the expected production. The first four zones are operated at two thousand degrees Fahrenheit, and the fifth at nineteen hundred degrees Fahrenheit, the latter being used as an equalizing zone to reduce the exit temperature spread, thereby increasing the uniformity of the product.


NO 2 PATENTING, CLEANING, & COATING RIG
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ROEBLING, NEW JERSEY
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(2) FUEL MIXTURE INLET
(3) SILICON CARBIDE TUBE
(4) SAND SEAL
(5) WATER COOLED EDUCTOR
(6) AIR INLET
(7) GAS ATMOSPHERE NOZZLE
(8) GAS INLET
(9) PILOT LIGHT
(10) EXPLOSION LID
(11) WATER OUTLET
(12) ATMOSPHERERE ESCAPE VENT
(A) FIRE BRICK TILE
(B) 2600° F SEMI-REFRACT INSULAT BRICK
(C) 2000° F S-R I. BRICK
(D) INSULAG
(E) ASBESTOS
(F) SILICON CARBIDE TILE
DKW

Figure 24.—Sectional Isometric Sketch of No. 2 Continuous Patenting, Cleaning, and Coating Rig.

The following chart illustrates the speeds and expected production tonnage from the various sizes processed on the furnace rig.

PRODUCTION RATES ON DREVER FURNACE

Furnace Temperature—2000 Degrees Fahrenheit (5th Zone—1900 Degrees Fahrenheit)

Wire Diameter (inches)	Speed (feet per minute)	Hourly Production (pounds per hour)
.082	147	1,900
.095	143	2,480
.107	127	2,860
.127	107	3,315
.135	100	3,504
.148	95	4,000

★ ★ ★

So successful has been the new Patenting, Cleaning, and Coating Rig that the Corporation decided to install a second rig. This rig is similar in nature to the original rig except for the furnace, which had to have the tube plugging problem eliminated.

★ ★ ★

Upon the conclusion of extensive investigation conducted by the Engineering Department, it was decided that the Gas Machinery Company of Cleveland, Ohio, had the answer with their radiant tube furnace. This furnace is similar to the first furnace in size and shape, with simpler internal construction (see figure 24). It consists of a steel shell mounted on legs about two feet above the floor, five and one-quarter feet wide, sixty feet long, and six feet high. The bottom part is constructed with three layers of semi-refractory insulating bricks which are from the outside in; five inches of two thousand degree Fahrenheit brick, five inches of twenty-six hundred degree Fahrenheit brick, and four and one-half inches of firebrick. The top is built with three layers of insulation for a total thickness of thirteen inches, and the components are from the inside out; a layer of twenty-six hundred degree Fahrenheit brick; a layer of insulag, which is a rock wool or slag wool material; and a thin finishing layer of asbestos, used to fill any air spaces. This precaution was taken to eliminate the possibility of an explosion resulting from the ignition of combustible gases filtering through from the hearth of the furnace.

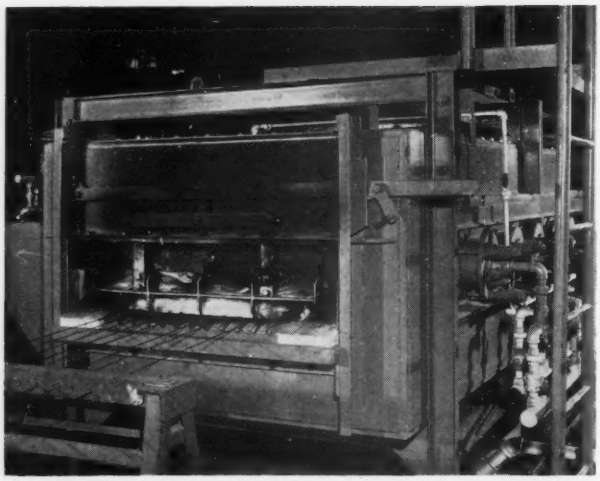


Figure 25.—Furnace Entrance and Burners No. 2 Continuous Patenting, Cleaning, and Coating Rig.

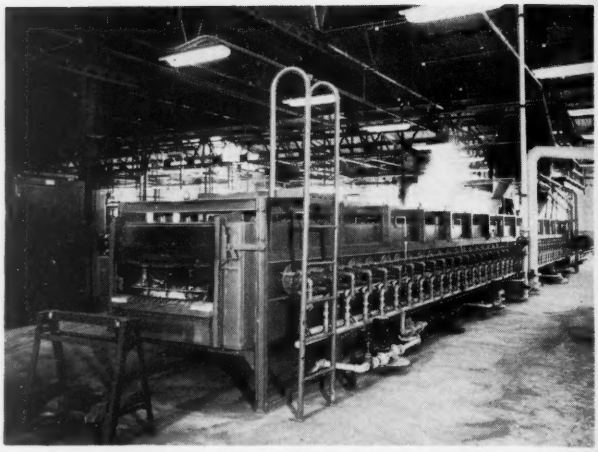


Figure 26.—Patenting Furnace No. 2 Continuous Patenting, Cleaning, and Coating Rig.

The overall internal size of the furnace is three feet wide and twelve and one-half inches high. Passing laterally through the center of the furnace is the series of forty-five, five and three-quarters inch silicon carbide tubes. The furnace is heated by radiation from the surface of the internally fired tubes. The burners (see figure 25) are fitted into the tubes and are held in place by a spring arrangement designed to compensate for the growth and expansion of the tubes. The tubes exhaust into short water-jacketed flues, and then the exhaust passes into the room. The flues are water-jacketed to cool the external part of the flues. A small air nozzle eductor is constructed in the base of each flue to maintain a negative atmospheric pressure in the tubes, so that the gases will be evacuated, thereby preventing them from leaking into the furnace. The furnace is designed for a maximum temperature of twenty-two hundred degrees Fahrenheit.

★ ★ ★

The furnace is fitted with a series of gas burners to introduce an atmosphere into it. The gas burns internally, consuming all the oxygen in the furnace. There is a series of vents to expel the excess gases of the atmosphere from the furnace, and each vent is equipped with a pilot light to burn all the expelled, combustible gases.

★ ★ ★

The furnace (see figure 26) is divided into five zones, each of which is automatically controlled by a Leeds and Northrup control unit connected to a thermocouple. The burners are fired in an impulse cycle, which means that the burners of any given zone are either burning wide open or burning on low flame. The number of cycles per unit of time is set and regulated in the controls, and the duration of any given cycle is determined by the heat required in the furnace. The controls operate an automatic valve in the air line, and when the valve is open the air will mix with the gas by aspiration in the mixing head. Each zone can be controlled manually and also can be set so the burners will always burn on low flame, in case the operation of the rig is to be temporarily suspended.

★ ★ ★

The gas line to each zone is equipped with a safety valve which will shut off the gas in the event of an electrical failure, an air line failure, or a gas line failure.

★ ★ ★

The pay-off swifts, the take-up blocks, the lead pan, the exhaust equipment, and the water spray tank are exact duplicates of those on the first rig. The only exceptions are the acid pan and the borax pan.

★ ★ ★

The new acid pan is larger by about seven feet, the purpose of which is to permit operation with a lower acid temperature, thereby eliminating the possibility of a breakdown of the rubber and brick-lined bath.

★ ★ ★

The borax coating bath arrangement is slightly different from the first rig in that two pans are used instead of just one. This facilitates continuous operation by eliminating the necessity of a shutdown while a new coating solution is prepared.

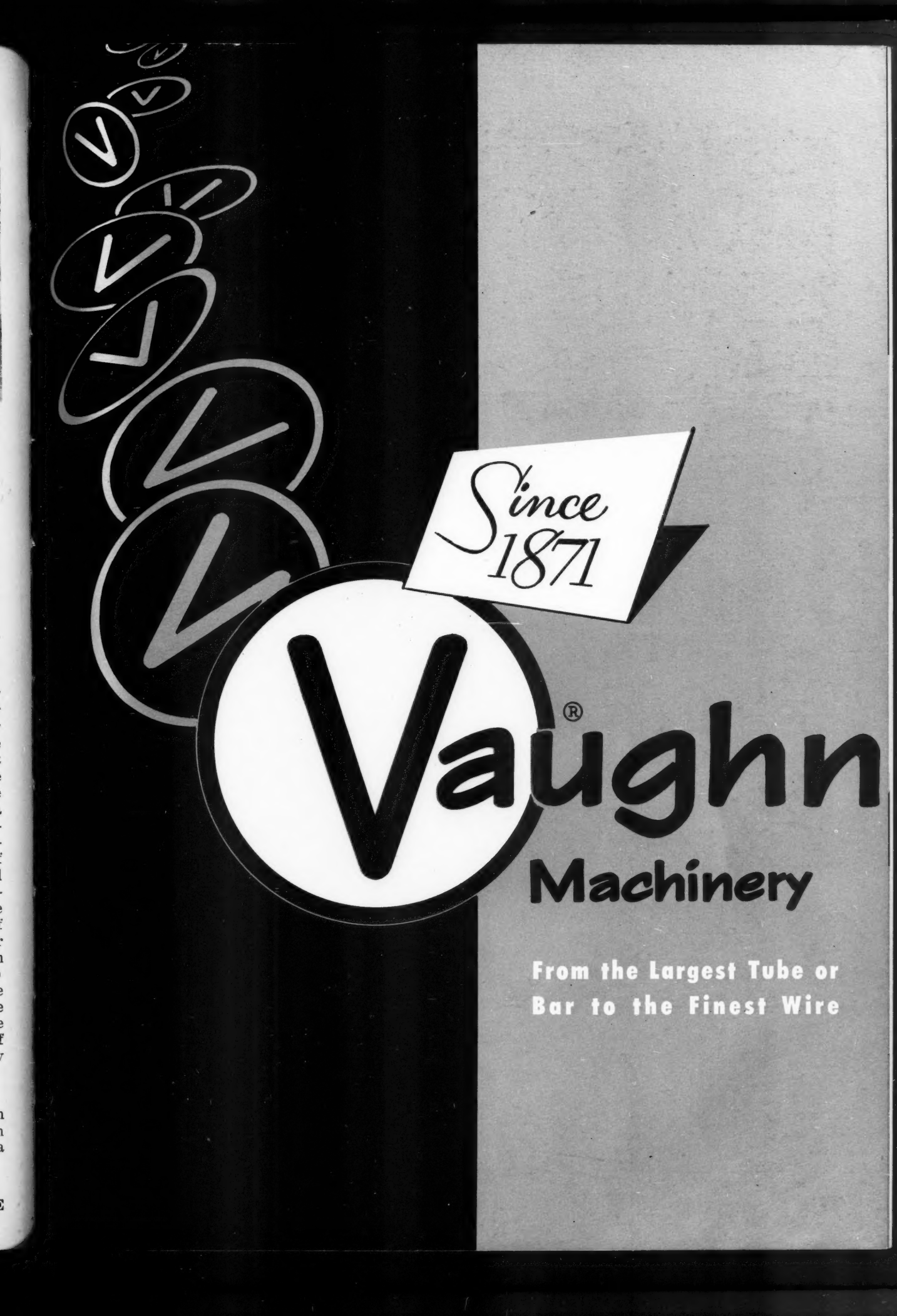
★ ★ ★

The operation of this second rig is similar to that of the first rig except for the starting of the rig or the threading of a broken wire through the furnace. On the first rig a wire was put through the furnace by pushing it through the tube, but on this new furnace, a different procedure has to be followed. A brick channel is constructed along the inside edge of the furnace and the wire is pushed through the furnace in this channel, and once that it is through the furnace, the wire is lifted out of the channel and set into the proper groove in the wire guide. A silicon carbide wire guide (see figure 25) is located at the entrance and the exit of the furnace to guide the wire while passing through the furnace and to prevent wearing of the entrance and exit surfaces by the wire.

★ ★ ★

Another modification made on the second rig affects the wire path as it leaves the dryer. There a

(*Please turn to page* 1248)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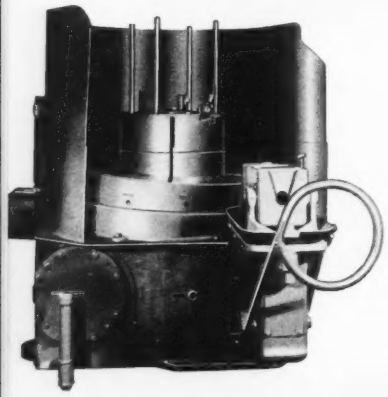

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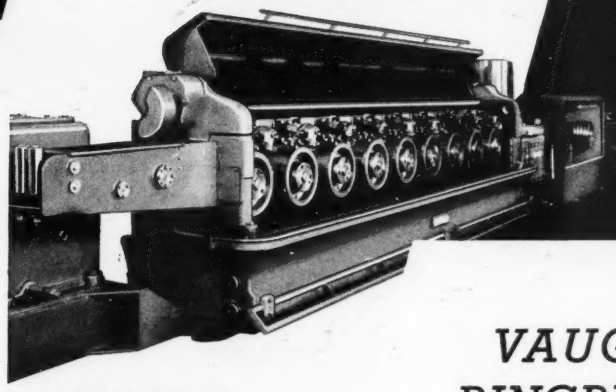

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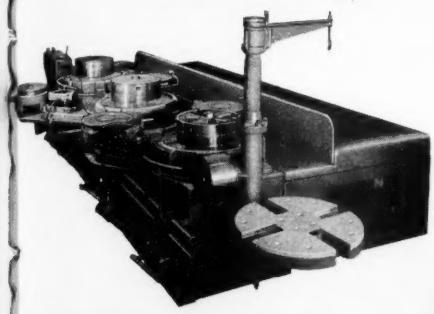

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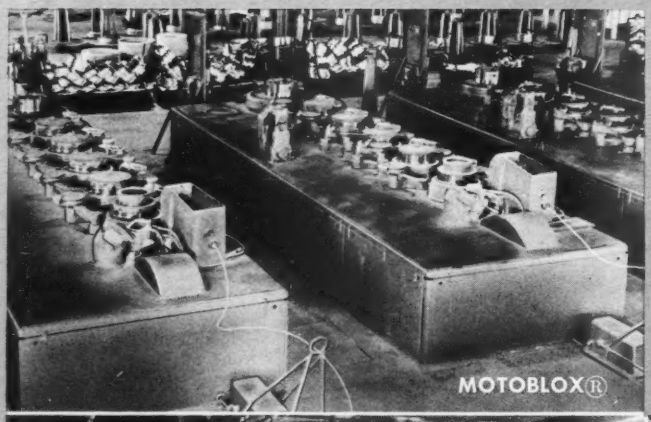

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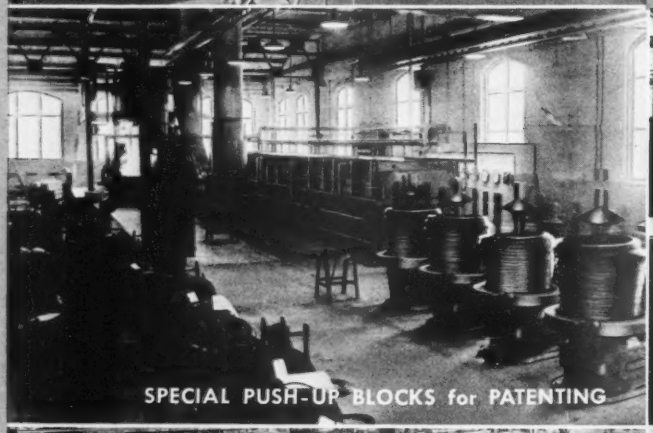

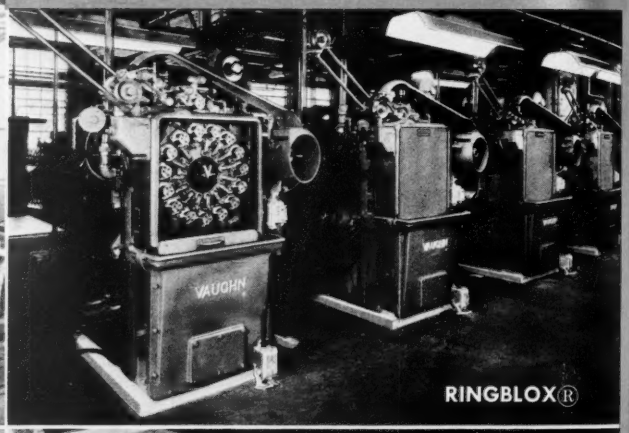

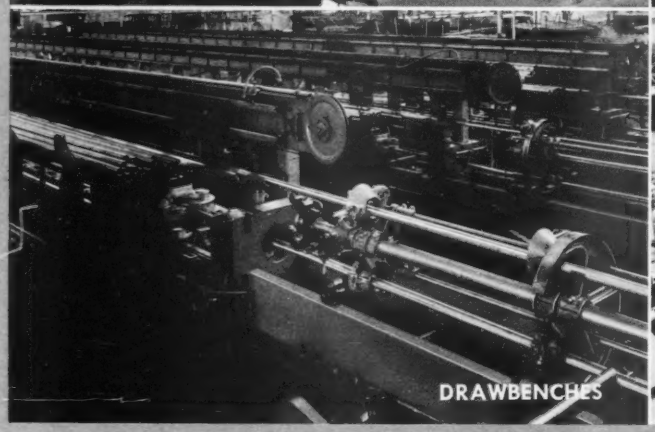

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The Effects of Coiling Temperature on Hot Rolled Rod

by R. A. Stebbins
Assistant Superintendent
Rod and Wire Division
Bethlehem Steel Company
Johnstown, Pennsylvania

It has been generally known that lower coiling temperatures on Rod Mills are desirable from the standpoint of the amount of scale formed which must be cleaned before further processing. It was this belief that prompted a more thorough investigation as to what temperature range should be sought and what were the actual results to be expected at various temperatures.

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In order to avoid getting data which may mean that the results obtained would apply only to the Rod Mill on which the tests were run, an agreed procedure was set up for the #1 and #2 Rod Mills at Sparrows Point and the Rod Mill and 10″ Bar Mill at the Johnstown Plant.

★ ★ ★

All tests were run using C-1008 grade steel and the temperatures were obtained by using an optical pyrometer during the coiling operation. No forced cooling was applied after this point.

Scale Loss

To determine the actual amount of scale formed at the various temperatures, we used approximately 2800# of stock in each size rolled and at each coiling temperature. Sparrows Point used seven 400# coils and Johnstown used nine 300# coils. Each coil, after rolling, was weighed to the nearest tenth of a pound, pickled in 5% Sulphuric Acid along with a previously pickled test piece to insure good inhibition, coated with light lime to prevent rust, dried and then weighed again to the nearest tenth of a pound. Preliminary tests made by using samples cut from coils were found to be misleading rather than informative because of the variation on strands depending on the amount of exposure during cooling.

The test runs were as shown on the next page.

★ ★ ★

Curve No. 1 illustrates the average amounts of scale in pounds per 1000 sq. ft. of rod surface area on all sizes coiled at the respective temperatures for each of the four mills involved. Curve No. 2 illustrates the average of all mills for each size to show that rod size does not materially affect the amount of scale formed per unit of rod surface area. Curve No. 3 is a combined curve using points established by averaging the results from all mills showing the rate of scale increase as the coiling temperature increases.

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For more practical consideration, Curve No. 4 shows the rate of increase in percent by weight of the various rod sizes. In general, the percent of scale is approximately double for rods coiled at 1750° F as compared to 1450° F, a difference of 300° F, whereas it again is approximately double for 1950° F as compared to 1750° F, a difference of only 200° F.

★ ★ ★

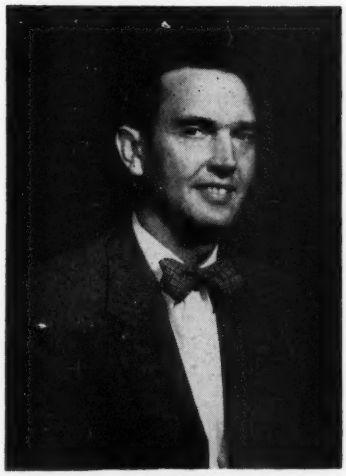
From this data we can conclude that there can be a substantial savings in yield by maintaining a coiling temperature of 1450° F.

Rod Surface

In comparing rod surface on these various tests, we found that the lower coiling temperatures (within practical operating limits) tend to promote a smoother surface.

Acid Consumption

To determine the effects of coiling temperatures on the amount of acid consumed in pickling, we used 7/32″ rod in quantities sufficient for three rounds through the acid tubs. Again we used coiling temperatures of 1450° F, 1600°F, and 1750° F. For each test we used a freshly mixed tub of approxi-



R. A. STEBBINS

The author graduated from Bucknell University in 1941, with a B.S. in Chemical Engineering. He started his employment in the Bethlehem Steel Company Loop Course in the same year in Bethlehem, Pennsylvania, and started work at the Rod and Wire Mill at the Sparrows Point Plant. Most of his time at this plant was devoted to research and development work. In 1949 he was promoted to General Foreman of the Wire Drawing and Heat Treating Units of the Johnstown Plant, and in 1950 became the Assistant Superintendent of the Rod and Wire Mills.

This paper was prepared for delivery at the Annual Convention of The Wire Association in Detroit, Michigan, on November 9, 1954.

COILING TEMPERATURES

Rod Size	Johnstown Rod Mill	Johnstown 10" Bar Mill	Sparrows Pt. #1 Rod Mill	Sparrows Pt. #2 Rod Mill
7/32"	1450° F	--	1450° F	1450° F
7/32"	1600° F	--	1600° F	1600° F
7/32"	1750° F	--	1750° F	1750° F
1/4"	1450° F	--	1450° F	1450° F
1/4"	1600° F	--	1600° F	1600° F
1/4"	1750° F	--	1750° F	1750° F
3/8"	1450° F	--	--	--
3/8"	1600° F	--	--	1600° F
3/8"	1750° F	--	--	1750° F
1/2"	--	1850° F	--	--
1/2"	--	--	--	1750° F
11/16"	--	1950° F	--	--
41/64"	--	--	--	1750° F

mately 5% H_2SO_4, zero iron and 180° F temperature. Curve No. 5 shows the average acid consumption of the two plants for cleaning rods coiled at the different temperatures. The actual values shown, we feel, are indicative rather than conclusive because acid consumption is not only a function of rod mill scale but a function of time which often depends on the equipment and the cranemen who are doing the work. Throughout any pickling operation, the acid is gradually being consumed by the scale in the bottom of the tank and to some extent on the steel surface, depending on the effectiveness of the inhibition.

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Additional data which were obtained in conjunction with these test involved pickling times and scale analysis. These data were not conclusive but they did show that the higher the coiling temperature, the more pickling time was required under the same pickling conditions and the higher the percentage of the ferric scale which is more insoluble than the ferrous scale.

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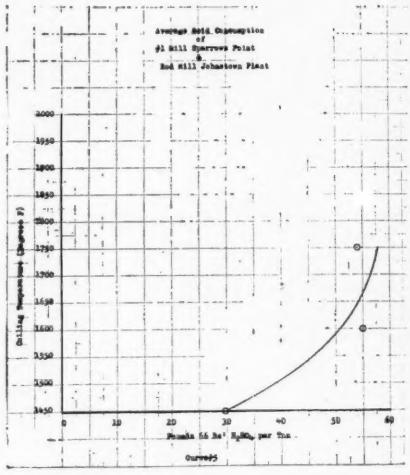
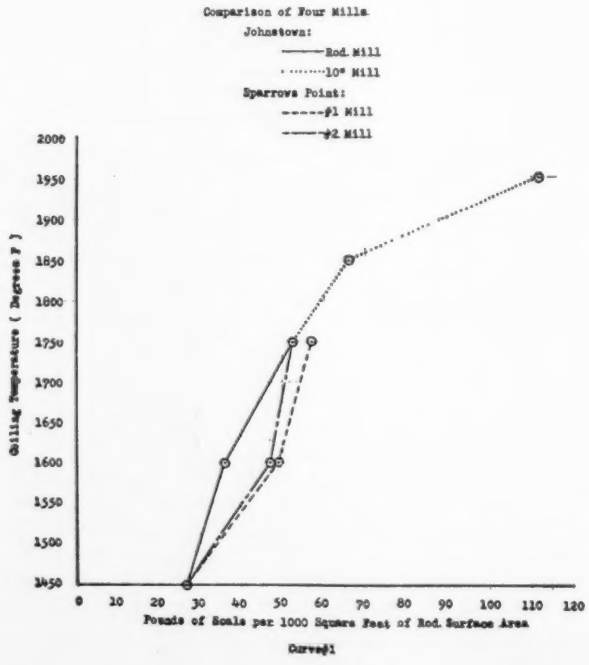
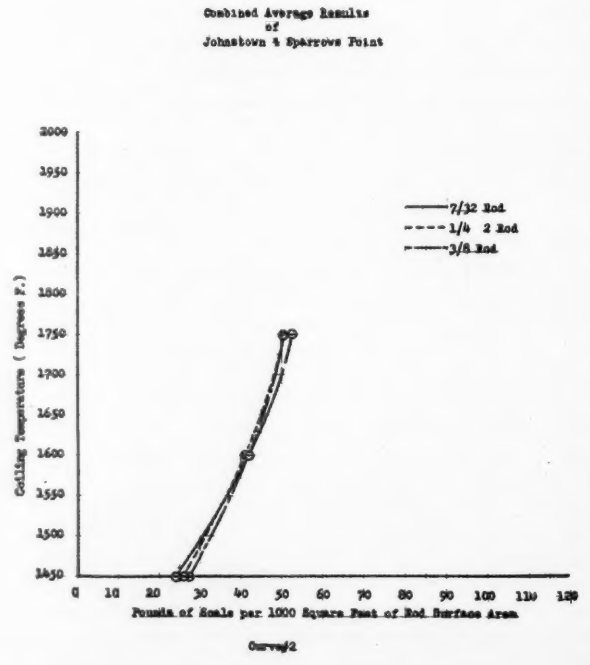
To summarize the data as shown

(*Please turn to page* 1247 *for conclusions and curves* 3 *and* 4.)







Cleaning of Stainless Steel For Wire Drawing

by John H. Corson
Manager of Metallurgical Laboratory
Carpenter Steel Company
Reading, Pennsylvania

Stainless steel is a relatively new metal. The first tonnage was melted in the early 1920's and the usage has increased until almost 1,000,000 tons per year are now manufactured. This is not startling until one considers the wide variations in analyses which are included. Although the bulk of the tonnage is mainly 12% to 16% chromium steels and 18% chromium—8% nickel steels, the extremes in analyses for stainless steels may include an 80% nickel—20% chromium alloy, and a 6% chromium—0% nickel steel.

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Methods of cleaning stainless steels have developed as the tonnage and diversity of analyses have increased. At first, the practices normally used for cleaning carbon steels were employed. This was not difficult as the first stainless steels were the 12% and 16% chromium steels without the benefit of nickel. With the development of the free-machining and austenitic grades, the sole use of an inhibited sulfuric acid was not particularly satisfactory. The free-machining grades are susceptible to acid burning and the austenitic grades are hard to clean. Often times mechanical scale breaking was employed to remove the heavy flaky scale and thereby minimize the required acid cleaning time. In the early 1940's the development of the use of molten salts was the key to modern production cleaning methods for stainless steels.

★ ★ ★

The purposes of this paper are: first, to review the underlying factors involved in the make-up of oxidized surfaces on stainless steels; and second, to present the various cleaning practices employed in industry in preparation for wire drawing.

JOHN H. CORSON

The author graduated from Lehigh University in 1943 with a degree of B.S. in Metallurgical Engineering. After two years in the armed forces he joined John A. Roebling's Sons Corporation in Trenton as a metallurgist becoming Head of the Metallurgical Laboratory Development Engineering Dept. In 1951 he joined Bethlehem Steel Company as a metallurgist in their Williamsport Plant, and in 1952 he went with the Carpenter Steel Company to take up his present duties.

This paper was prepared for presentation at the Annual Convention of The Wire Association in Detroit, Mich., on November 9, 1954.

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One of the main factors is the heaviness of the oxide, and this varies with the type of annealing. Generally on all sizes of bars and rods, even including coarse and medium wire sizes, a batch type annealing furnace is used. This type of furnace is operated with oxidizing conditions and produces the heaviest scale of all the types of annealing. On large sizes of wire and rod sizes up to ⅜" round, strand annealing is feasible. In this process, a very uniform friable scale is produced. On fine sizes of wire a bright strand anneal with no discoloring oxide is possible.

★ ★ ★

Batch type annealing, due to its nature, involves problems which are not present in strand annealing, and these more than any others dictate cleaning practices. One of the problems is the annealing of wire sizes below .150" diameter. The coils are compact so that it takes a longer time to heat throughout. The exposed rings become heavily scaled, whereas the center rings have a normal oxide condition. On the free-machining grades, soap and grease lubricants have a great effect. Even with a normal anneal and cleaning, the combination of circumstances may result in a burned surface. In particular, the use of grease as a lubricant—and this is not restricted to the free-machining grades of steel—produces a scale which after water quenching may blast off in spots, leaving perfectly bright locations. After cleaning, the bright locations are acid burned while the remainder of the coil has a normal cleaned surface. Lastly, there are the instances where, when oil is used for heating and a burner gets out of adjustment, a few coils may be either flame burned or carburized. Either condition is generally localized on the coil, but creates undesirable surface conditions after cleaning.

★ ★ ★

A knowledge of the oxide composition of several common grades of stainless steels is of interest. Recent research work (1) on types 410, 304, and 316 gives analyses of oxides formed on these steels when heated to 900°C. These are summarized in Table I. For comparison purposes on Type 304 stainless, the composition is given for a chemi-

TABLE I

OXIDE COMPOSITIONS ON SEVERAL STAINLESS STEELS

NOMINAL COMPOSITION - PERCENT

	Type 410	Type 302	Type 316
C	.12 max	.08/.15	.08 max
Mn	1.25 max	2.00 max	2.50 max
Si	1.00 max	1.00 max	1.50 max
Cr	11.50/13.50	17.00/19.00	18.00/20.00
Ni	----	7.00/10.00	11.00/15.00
Mo	----	----	3.00/4.00
Bal.Fe	80 approx.	70 approx.	62 approx.

APPROXIMATE OXIDE FILM COMPOSITION - PERCENT

When Heated At 900°C

	Type 410	Type 304	Type 316
Fe	50	20	42
Cr	15	30	30
Ni	0	6	5
Mo	0	0	2
Si	4	5	5

OXIDE COMPOSITION OF A PASSIVATED FILM ON TYPE 304

Fe	28
Cr	14
Ni	9
Si	10

cally passivated film. The percentage of oxide components is expressed in terms of percent of an element and not percent oxide. This is done to show the relative change in composition from base metal to oxide. The changes (1) (2) (3) are the same for the three grades listed; that is, chromium and silicon concentrate in the scale, and iron, nickel, and molybdenum occur in lesser amounts than in the metal. This applies to the 900°C heating. The composition of the passivated surface is of interest and is included because of the higher silicon and lower chromium contents.

* * *

Another aspect of this subject is the physical make-up (4) of the scale. To demonstrate, it is necessary to examine scales which have been produced by prolonged heating cycles and which cannot be compared with those formed in normal production practice. Figures 1 and 2 illustrates the oxide layers on Types 410 and 430. They

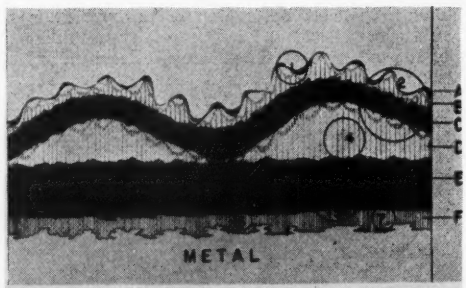

Fig. 3 - Type 446. Diagrammatic representation of scale cross section. Layers B,D, and F are silica. Layers A and C mostly spinel. Layer E mostly Cr_2O_3. The numbered circles show where samples were taken for X-ray diffraction and spectrographic analysis.

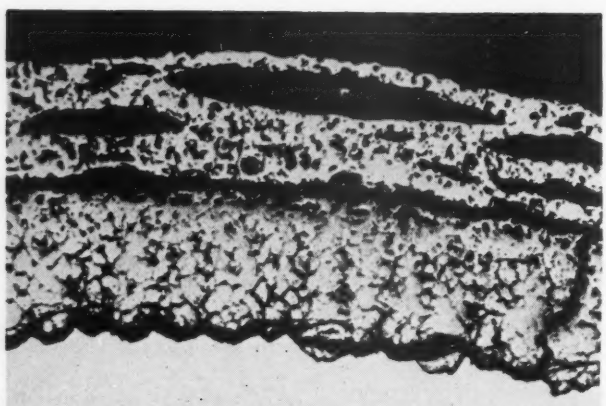

Fig. 1 - Type 410. Showing layered structure of scale of a type more like scale on unalloyed iron than on the type 446 specimens. Note whiter (optically active) outer portion of outer layer indicating $(Fe,Cr)_2O_3$. Unetched. X100.

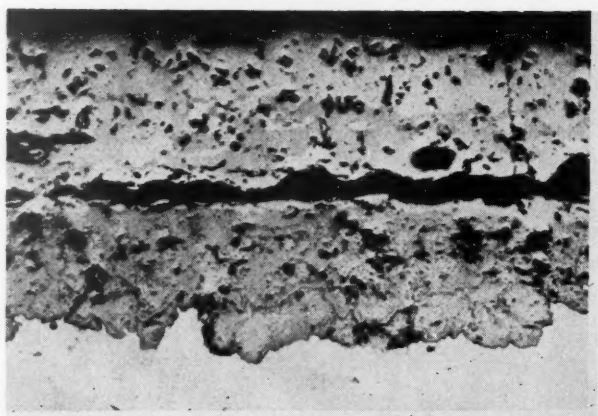

Fig. 2 - Type 430. Showing layered structure after the fashion of scale on unalloyed iron. Outer layer is mostly $(Fe,Cr)_2O_3$ (optically active) except for darker islands. Outer surface of inner layer is $(Fe,Cr)_2O_3$. Unetched. X250.

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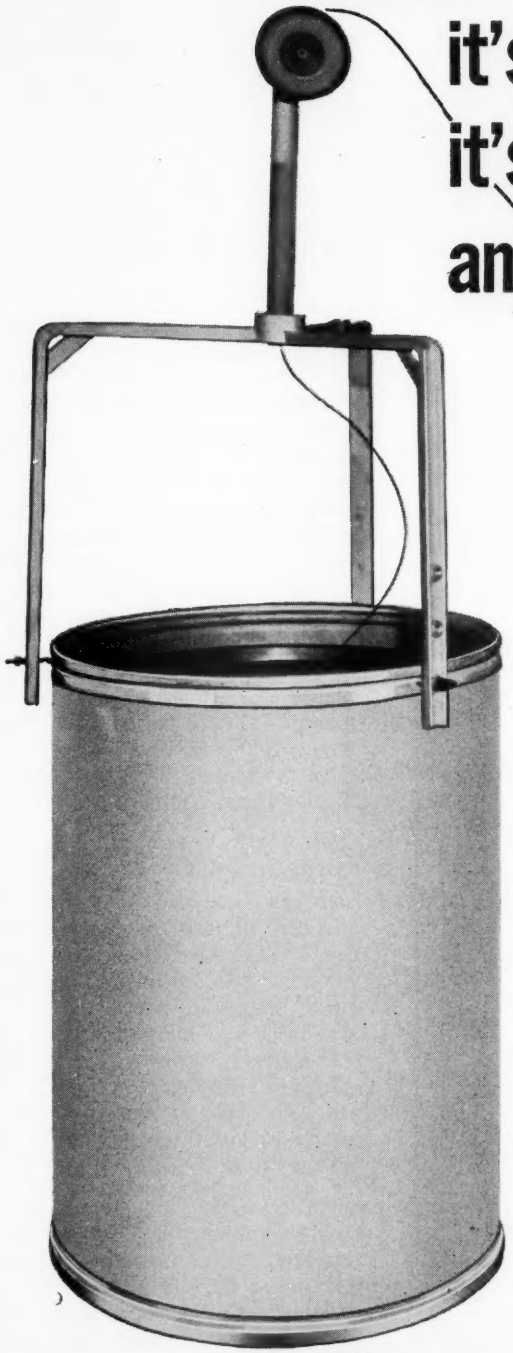

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SAVES TIME—Payoffpak can hold 600 lbs. Downtime on the wire drawing machine, due to stripping operations, is greatly reduced.

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A survey indicates that often more than 50 labor steps are needed to convert 500 pounds of steel wire in standard eight inch coils—but you can do the same job with Payoffpaks in an average of five operations. No wonder they are calling this new container "the long-playing record of the wire industry" See how Payoffpaks can pay off for you. Call Continental for complete information on this exciting new way to package, handle and dispense wire.

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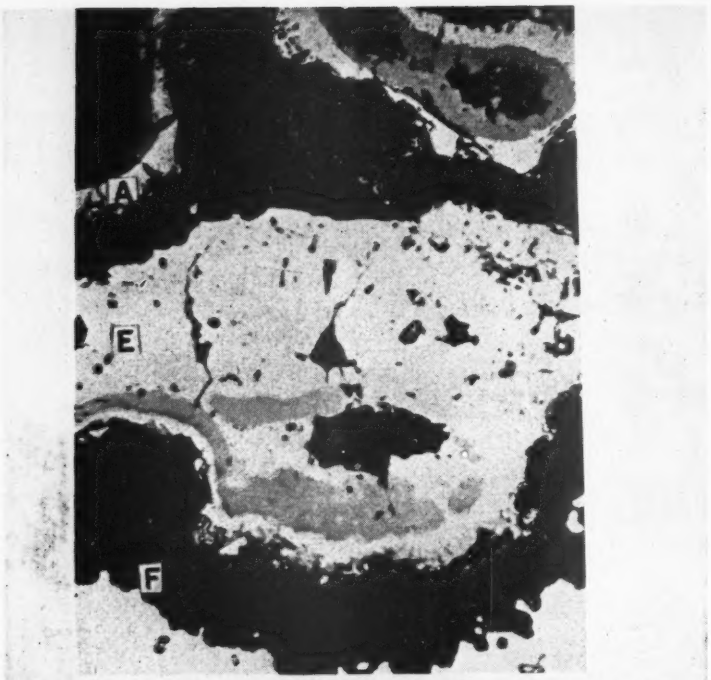

Fig. 4 - Type 446. Unetched. X500. a-Showing silica layer (F) against metal and clinging to underside of glassy layer, remnants of metal grains in both these silica areas, darker gray islands in highly reflecting glassy layer (E). Letters correspond to lettered layers of sketch shown in Fig. 3.

TABLE II

INDUSTRY CLEANING PRACTICES

Bar and Coarse Wire Manufacturers

AUSTENITIC STEELS

1. Sodium Hydride
   Water Quench
   Sulfuric Acid
   Water Wash
   Nitric-Hydrofluoric Acids
   Water Wash

2. Sodium Hydride
   Water Quench
   Muriatic Acid
   Water Wash
   Nitric-Hydrofluoric Acids
   Water Wash

3. Virgo Salts
   Water Quench
   Muriatic Acid
   Water Wash
   Nitric-Hydrofluoric Acids
   Water Wash

4. Virgo Salts
   Water Quench
   Sulfuric Acid
   Water Wash
   Nitric-Hydrofluoric Acids
   Water Wash

5. Caustic
   Water Quench
   Sulfuric Acid
   Water Wash
   Nitric-Hydrofluoric Acids
   Water Wash
   Permanganate
   Water Wash
   Sulfuric Acid
   Water Wash

CHROMIUM STAINLESS STEELS

The procedure is the same except that nitric acid is used instead of nitric hydrofluoric acid. This includes producer #5.

TABLE III

INDUSTRY CLEANING PRACTICES

Fine Wire Manufacturers

1. Virgo Salts
   Water Quench
   Krupp Solution
   Water Wash
   HNO_3
   H_2O_3

2. Sulfuric Acid
   Water Wash
   Nitric-Hydrochloric Acids
   Water Wash

3. Sodium Hydride
   Water Quench
   Nitric-Hydrochloric Acids
   Water Wash

represent excessive layers of iron and chromium oxides created by heating 350 hours at 1600°F. Figures 3 and 4 represent respectively a schematic and an actual view of oxide layers on Type 446 (27% Cr). This steel was heated 700 hours at 2000°C. They are of interest as they help one visualize the mechanics of scale formation, particularly the action of silicon. Layers B, D, and F in Figure 3 are silica, whereas A, C, and E are mainly chromium oxides. The corresponding layers are present in Figure 4. With this as a background let us now examine the practices employed in industry.

★ ★ ★

The most interesting fact about cleaning stainless steels is the lack of agreement upon a common cleaning practice among the tonnage producers. This is rare in industry and is surprising in view of the expensive acids and molten salts involved. In order to present an industry-wide summary of the various methods employed, several of the manufacturers were asked to permit the publishing of their practices of cleaning AISI Types 304 and 430 stainless steels. These practices are broken into two groups: those for bar and coarse wire producers, and those for fine wire producers. They are listed in Tables II and III respectively.

★ ★ ★

The cleaning of coarse wire and rod follows a general pattern. This includes, first of all, a molten salt bath treatment followed by a water quench, and, secondly, immersion in a series of acids with water washes between each. Beyond this generalized agreement the divergence of opinion commences, and the exponents of each practice are ready and willing to defend their own system.

★ ★ ★

Two molten salt baths are in general use: the sodium hydride promoted by the E. I. duPont de Nemours Company, and the Virgo de-scaling salt promoted by the Hooker Electrochemical Company. The duPont Company claims that the sodium hydride actually reduces the scale according to the following equations:

$$4\ Na\ H + Fe_3O_4 = 3\ Fe + 4\ NaOH$$
$$NaH + Cr_2O_3 = 2\ CrO + NaOH$$

★ ★ ★

According to the Hooker Electrochemical Company, the Virgo salt "conditions the scale." Those who use it believe the bath is oxidizing in nature. The individual proponents of the sodium hydride believe it does a more proficient job by reducing the oxide, whereas the proponents of the Virgo believe that it does the work more economically. The relative merits of sodium hydride are subject to discussion when the concentration of sodium hydride is discussed. Some plants adhere to the manufacturers' recommendations, but others may maintain approximately 1.0 to 1.25% sodium hydride instead of 1.5 to 2.00% as recommended. With the higher sodium hydride concentrations, the oxide reduction is more efficient and more costly. The loss of heat and hydride by oxidization at the bath interface can be minimized by the use of a charcoal blanket.

★ ★ ★

After five to twenty minutes in a molten salt bath, the steel is water quenched for the purposes of blasting off any loose scale and dissolving off the caustic.

★ ★ ★

The next step is immersion in acid, and here a second controversy arises because some plants use sulfuric acid and others use muriatic acid. The acid cost versus speed and power of cleaning is the main issue. The sulfuric acid is usually kept at 10% to 15% by volume, and the muriatic acid 10% to 17% weight by volume. Inhibitors in the acids are not usually employed.

★ ★ ★

From this point on, every one is in agreement. Nitric acid is used to oxidize the smut and thereby brighten the AISI 400 series stainless steels; and nitric-hydrofluoric acid, generally a 10-2 mixture, is used on the AISI 300 series stainless steels for the same purpose.

★ ★ ★

Four out of five producers of coarse wire are in reasonable agreement, but the fifth producer of coarse wire also employs the permanganate and sulfuric acid dips subsequent to the normal procedure. Apparently the need is felt for additional cleaning or surface preparation.

★ ★ ★

Those producers who primarily manufacture fine wire have a completely different approach. As there is less scale on fine wire, less acid attack should be required, and this appears to be the case. In this group there is a complete divergence of opinion as to the proper practice. One producer doesn't have need of a molten caustic bath, whereas another needs only a nitric-hydrochloric bath after a sodium hydride treatment to do the job. A third one uses a Krupp solution (15% H_2SO_4 — 2½% HNO_3 — 2½% HF) which is an unusual but powerful cleaning medium.

★ ★ ★

At this point, both theory and practice have been discussed. Any one stainless steel producer generally manufactures grades and sizes which includes the complete range of scale conditions and compositions.

★ ★ ★

Each of the various producers has complete faith in his practice, and there is probably good reason for it. In addition, the difference in the practices is not as great as might appear and is mainly one of emphasis.

★ ★ ★

The following paragraphs summarize the writer's opinions on the various practices.

★ ★ ★

Each acid and salt is a powerful one under the conditions employed. The various practices indicate where the emphasis is placed on doing the work of cleaning. Use of sodium hydride with the recommended hydride content puts the emphasis on that phase. Under this condition, sulfuric acid is strong enough to complete the job. For those who employ the Virgo or sodium hydride with a reduced hydride content together with muriatic acid, the burden of the work appears to be shifted to the more powerful muriatic acid. The third combination is the use of the Virgo in conjunction with sulfuric acid. With this, it is believed that the work load is shifted to the nitric-hydrofluoric acid.

★ ★ ★

Use of muriatic acid versus sulfuric acid has some interesting aspects other than cost. As muriatic acid is quite powerful, it has an overall attack on the surface and produces an extremely bright surface. This in is contrast to sulfuric acid which has a differential attack and results in localized pitting. Although pitting is a matter of degree, it is sufficient to change the character of the surface so that it is dull by comparison.

★ ★ ★

The one unusual acid employed is the Krupp solution, which is extremely powerful. This acid has the aspect of a universal solvent as regards stainless steel.

★ ★ ★

It is hoped that this presentation of the physical and chemical make-up of oxides in stainless steels, together with the diverse practices of removing them, will stimulate discussion of this subject. Surely, one best practice may be evolved which will clean stainless steel for wire drawing more cheaply and better than the others, in spite of variations within different plants.

Acknowledgement

The writer wishes to express his appreciation to The Carpenter Steel Company for permission to publish this paper and to the other companies who permitted the publishing of their stainless steel cleaning practices.

References

1. **T. N. Rhodin, Jr.—"Oxide Film Composition Studies"; New York Academy of Sciences, 1954.**
2. **E. M. Mahla and N. O. Nielsen—"A Study of Films Isolated From Passive Stainless Steels." Transactions of the Electrochemical Society, Vol. 93, 1948.—Pages 1 to 15.**
3. **W. H. J. Vernon, F. Wormwill, T. J. Nurse—"A Study of the Surface Film in Chromium Nickel (18-8) Stainless Steel." The Journal of the Iron and Steel Institute, Vol. CL, #2, 1944.—Pages 81 to 92.**
4. **D. Caplan and M. Cohen—"High Temperature Oxidation of Some Iron Chromium Alloys." Transactions AIME, Vol. 194, 1952.—Pages 1057 to 1065.**

You hear this said more and more in the trade:

STANDARD SIZES

Flange	Traverse	Barrel	Arbor
2½"	3" 3¼"	1¾"	.628"-.633"
3"	3" 3¼" 3½"	1¾" or 2"	.625"-.633"
4¼"	3" 3¼" 3½"	3¼"	.635"
4½"	3" 3¼" 3½"	2½"	.635"
4½"	6"	2½"	.635"
5"	2¾" 3"	3.880"	.531"
6"	3" 3¼" 3½"	3½"	.635"
6"	3" 3¼" 3½"	3½"	3"
6"	6"	3" or 3½"	.635"
6"	6"	3½"	3"
6½"	3" 3¼" 3½"	3½"	635"
6½"	3" 3¼" 3½"	3½"	3"
6½"	6"	3½"	.635"
6½"	6"	3½"	3"
7"	3" 3¼" 3½"	3½"	.750"
7"	6"	3½"	.750"
8"	3½" 6" 6¼"	4"	3" or 3 33/64"
8¼"	3½" to 7½"	4"	3.630"
10"	6"	5"	Optional
12"	6"	6"	Optional

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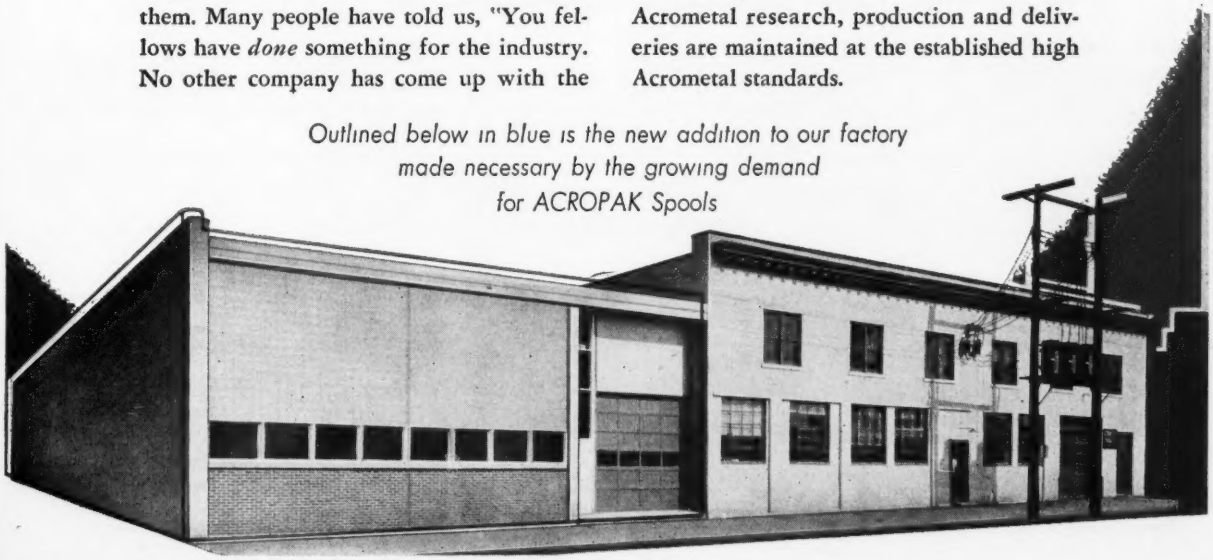

Processing of Wire Products in Salt Bath Furnaces

by Leon B. Rosseau, Vice President
Ajax Electric Company
Philadelphia, Pennsylvania

This paper, as evidenced by its title, is intended to bring out, in a single cover, the status of the salt bath furnace in your industry and will cover a variety of applications all but one of which are in current operation. The examples given and the data tabulated, however, are limited to the type of equipment with which the writer is familiar, namely, the internally heated or immersed electrode type of furnace.

Principal Applications

There are quite a variety of applications involved and they cover a wide range of products. For the purpose of this discussion, they are summarized as follows:

1. **Process or intermediate anneals, intended to soften wire products and remove the hardness imparted by cold working in the drawing operation.**
2. **Solution treatment to condition the material and permit its subsequent hardening by an aging or reheating operation. This type of treatment is principally applied to nonferrous alloys of copper and aluminum.**
3. **Descaling which is used to remove scale on annealed or heat treated materials.**
4. **Patenting of high carbon wire.**
5. **Special applications such as cleaning and fluxing prior to galvanizing and aluminizing.**

Intermediate or Process Anneal

This operation is always present in a wire mill and there are several methods of accomplishing it. Basically, however, it should meet the following requirements:

1. **Elimination of scale on the wire, not only because of the problems presented by its removal, but also because of the metal, and therefore monetary loss it entails.**
2. **Short time cycle in order to reduce the amount of materials in process.**
3. **Acceptable annealing costs.**
4. **Smallest over-all investment and floor space requirements.**

LEON B. ROSSEAU

The author is a graduate of Cornell University, with a degree in Electrical Engineering. He later studied Metallurgy at Temple University and earned a Baccalaureate Degree at Sorbonne, Paris, France. He served with the General Electric Company for sixteen years as Industrial Heating Specialist in the Atlantic District. For the last thirteen years he has been district Manager and Sales Manager of the Ajax Electric Company, of which he is presently Vice President.

His paper was prepared for presentation at the Annual Convention of The Wire Association in Detroit, Michigan on November 9, 1954.

These requirements are met, to a remarkable degree, by salt bath furnaces of modern design, particularly where a range of products, and therefore flexibility of operation is involved. These conditions apply especially in medium sized plants handling specialty products.

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Obviously, the size and type of equipment must be suited to the requirements and will vary from installation to installation. Table 1 gives a condensed picture of the materials, salts, type of furnace, time temperature cycles, which are in actual use.

Furnace Equipment

The annealing furnace itself, in all cases, is a salt bath furnace of the required dimensions and is internally heated by utilizing the resistance of the salt itself to the passage of electric currents. This internal heating simplifies the design of the furnace, greatly improves its efficiency and service life and is accomplished in the following manner:

TABLE 1
Process Anneal of Cold Drawn Wire

PRODUCTS	OPERATING TEM.	SALT	POT	TIME CYCLE	SIZE OF WIRE	RESULTING HARDNESS
Low Carbon Steel	1275-1300°F	Carbonate Chloride	Steel	15 to 30 min.	28 ga. to 3/8"ø	Rb 60-70
Eng Steel	1300-1425°F	Carbonate Chloride or Chloride	Steel or Ceramic	30 to 60 min.	20 ga. to 1/4"ø	Rb 65-Rc 15
High Carbon	1275-1300°F	Carbonate Chloride	Steel	30 to 60 min.	1/8 to 1/2" ø	Rb 85 to Rc 15
Brasses & Bronzes Copper	950-1150°F	Nitrates	Steel	15 to 30 min.	20 ga. to 1/4"ø	
Aluminum Alloy	750-850°F	Nitrates	Steel	20 to 30 min.	20 ga. to 1/4"ø	
400 Series Stainless	1500-1600	Chlorides	Ceramic	20 to 30 min.	#20 ga. to 1/4" ø	
300 Series Stainless	1850-1950	Chlorides	Ceramic	20 to 30 min.	#20 ga. to 1/4"ø	
Nickel Chrome	1850-2150	Chlorides	Ceramic	5 to 30 min.	28 ga. to 1/4"ø	

One or more pairs of heavy metal bars are located in the salt, closely spaced, and connected to the secondary terminals of multiple voltage air cooled transformers. These bars are called electrodes. The voltage applied ranges from 8 volts to 20 volts, depending upon the temperature, the salt and the depth of the furnace.

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Since fused salt is a relatively good conductor, current will pass through the salt whenever voltage is applied to the bars. This current heats the salt. At the same time, however, due to the electro magnetic field produced by the current in the electrodes, salt is squirted downward at considerable velocity so that the body of salt between the electrodes is constantly replaced and is not subjected to overheating. The construction is illustrated by Figure 1. Whenever a steel pot is used, the electrodes will enter from the top as shown in Figure 1. However, where a ceramic pot is used, they may also, if preferred, enter through the ceramic pot itself as shown in Figure 2. This so called submerged electrode design usually is preferred for the higher temperatures because of improved furnace efficiency and longer life.

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This type of furnace has a remarkable uniformity of temperature throughout its working volume. The difference at any point can easily be kept within plus or minus 10°F and even less. The amount of power which can be introduced into the furnace is very high. As much as 50 kw can be generated by a single pair of electrodes. This is of considerable benefit since, when coupled to the very high rate of heating of the work obtainable in salt, it permits a large number of pounds to be processed each hour in a relatively small unit. By referring again to Table 1, it is seen that in all cases the total time in the furnace seldom reaches one hour and often is less than 30 minutes.

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The furnace will have a pot selected to fit both the temperature requirements and the chemistry of the salt used. Steel is used for the lower temperatures where nitrate salts or mixtures of sodium carbonate and potassium chloride are used. Ceramic pots are used with chloride salts and at the higher temperatures.

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Incidentally, ceramic pots are usually constructed of bricks or special tiles of somewhat acid silica-alumina composition which will not withstand heavy concentration of basic materials. Therefore, a carbonate type salt should not be used in a ceramic pot.

Covers

The furnace is electrically heated, and for reasons of economy, efficient covers are mandatory. Two different types are used. A single piece cover is illustrated in Figure 3. This necessitates a work support fixture which is entirely below the cover, resting generally on the sides of the pot.

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Naturally, such a fixture must be heavy since it operates at elevated temperatures and this weight may become an economy problem. In that case, a split cover design is adopted as shown in Figure 4. The advantage of this type lies in the fact that only a part of the support fixture is subjected to temperature and, therefore, the net to gross weight ratio can be improved. These covers can be either manually or motor operated as desired.

Work Support Fixtures

A great variety of design of work support fixtures are in use, no two plants using duplicate types. This is no doubt due to varying conditions, but also because these are invariably built by the users and each has his own ideas. A few types may be of interest and are shown in Figure 5.

Where the wire size is small, it is often necessary to provide more than one point of support to prevent "horse collaring."

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Notice, however, that in all of these the coils hang in a vertical position. This is for the reason that draining of the salt during removal from the furnace and its subsequent removal during

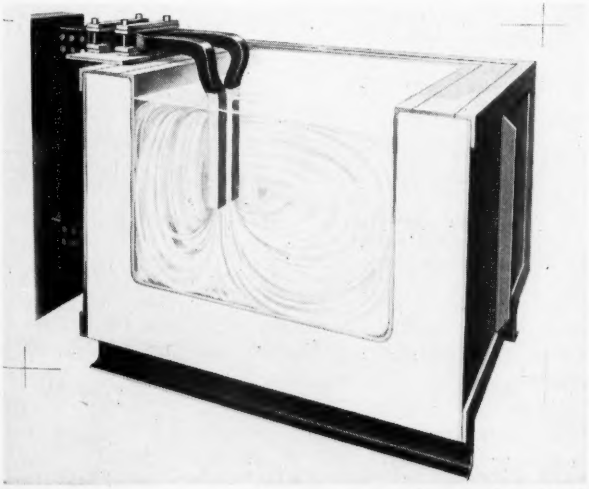

Figure 1.

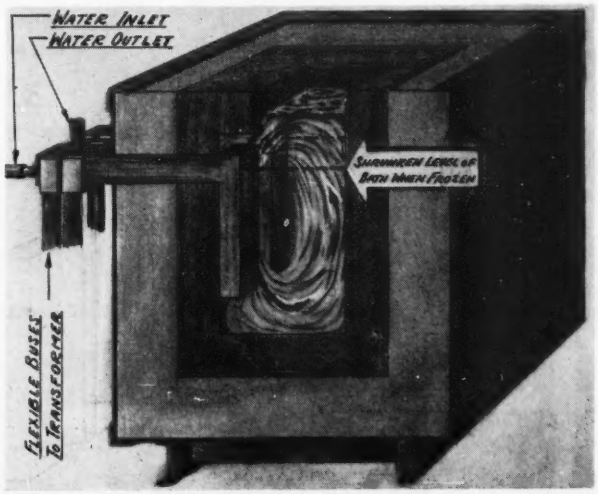

Figure 2.

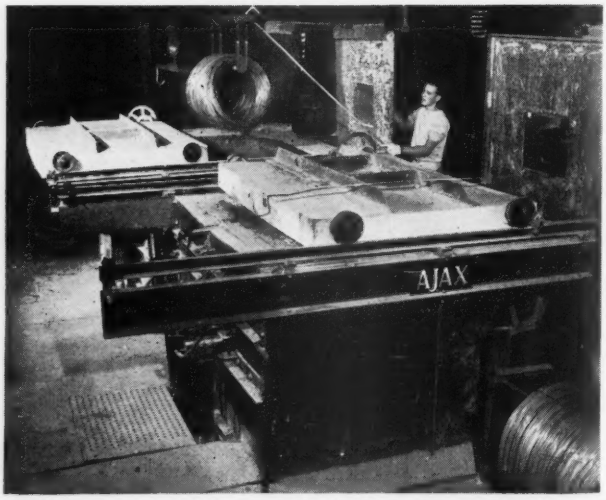

Figure 3

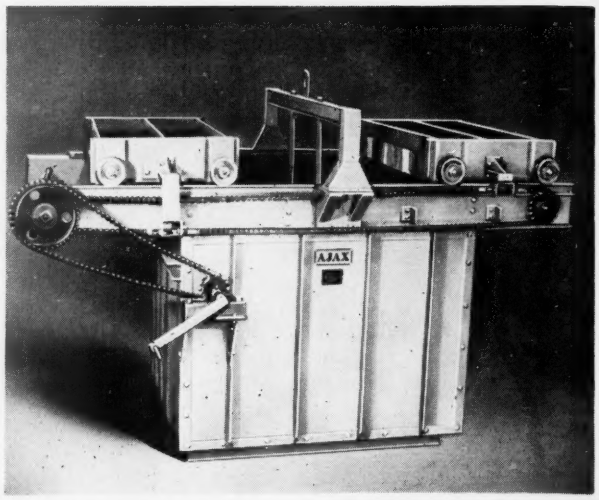

Figure 4.

quenching and washing operations is more readily accomplished.

Annealing Costs

The cost of annealing wire is, of course, composed of several factors. It has not been possible for the writer to secure accurate and reliable over-all figures for many reasons, the principal one being that such information is not generally divulged. However, there are several major components which can either be calculated or secured and which may be of interest. These cover the cost of the power required for the operation, the cost of the salt consumed and a reasonably accurate picture of the maintenance requirements of such a piece of equipment.

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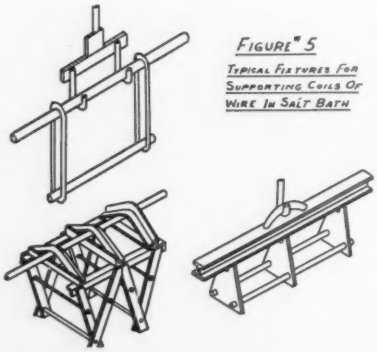


FIGURE 5
TYPICAL FIXTURES FOR SUPPORTING COILS OF WIRE IN SALT BATH

The kilowatt hours required to produce a net ton of 2000 of wire, assuming that a ratio of net to gross weight heated of .666 is used, will be shown in Table no. 2. Obviously, the power consumption will vary with the size of the furnace and the type of operation. For this reason the power consumed per ton may be below or above the data shown in Table no. 2 which represents the characteristics of medium sized units in actual service.

Salt Consumption

The work being heated in salt will, obviously, drag out an appreciable amount when it is removed from the furnace. In addition, some is consumed by fuming, when the higher temperatures are used, some is removed from the furnace

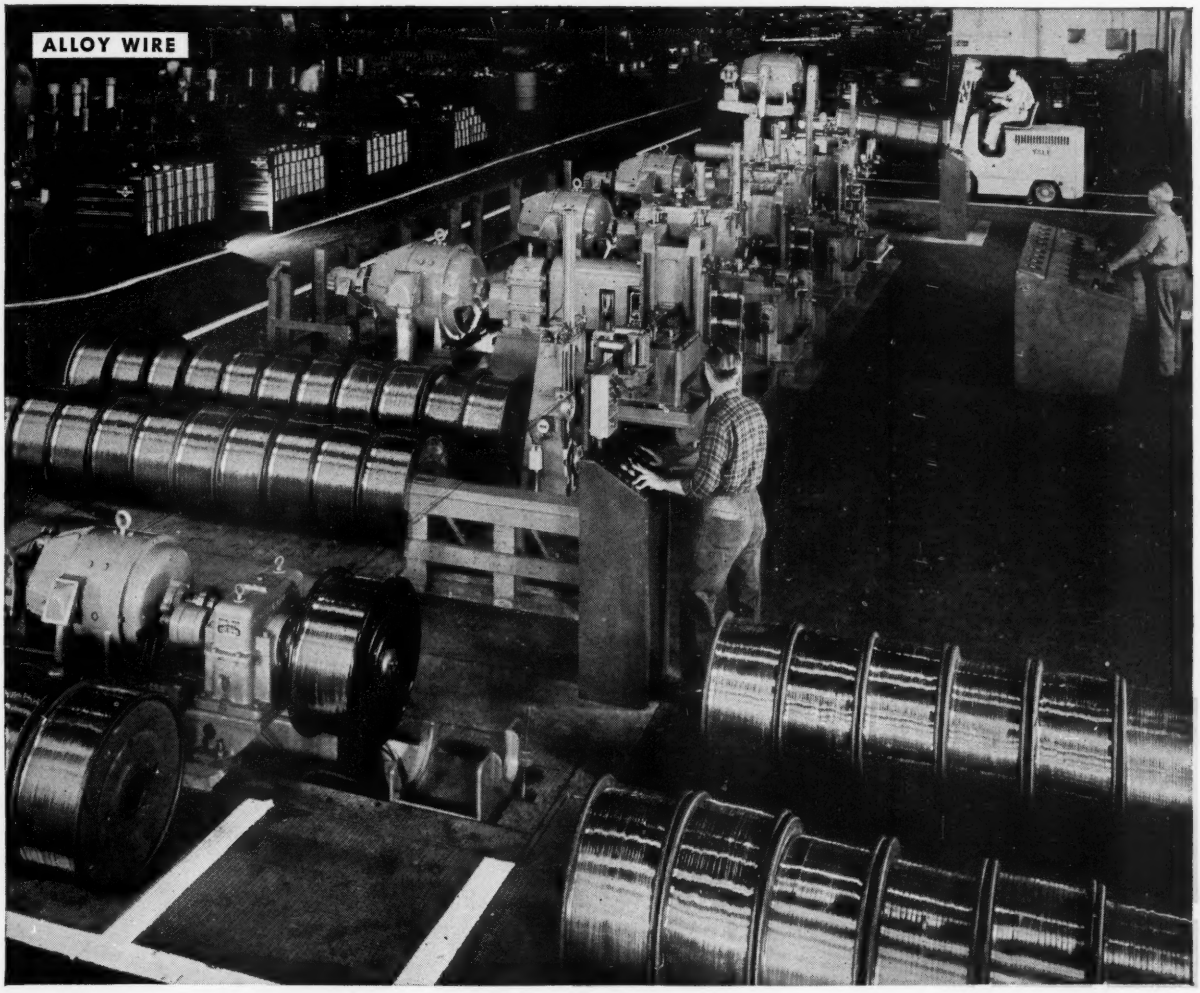
TABLE 2

Process Annealing
Power consumption in kwh/net ton
Net to gross-weight-heated Ratio - .667
Including all stand by and weekend losses at reduced temperature (above M.P. of Salt)

Temp. °F	Material	Power kwh/ton			
		5 Day Operation			Continuous Operation
		1 Turn	2 Turn	3 Turn	
900°F	Aluminum	360	283	250	245
	Copper	148	118	107	102
1150	Brasses	247	194	174	162
1300	Steel	400	294	264	245
1600	400-Stainless	585	440	392	365
1950	300-Stainless	882	653	573	528
2050	Chrome Nickel	2390	1600	1345	1195

TABLE 3
Process Annealing
Over-all Salt Consumption per Net Ton of 2000#

Wire Size	Nitrates	Carbonate Chlorides	Chlorides
24 to 28 ga.	30-40#	35-45#	50-100#
20 to 24 ga.	22-30#	25-35#	35 to 50#
14 to 18 ga.	16-22#	18-23#	24-30#
11 to 12 ga.	13-15	14-16	18-22
1/8" to 1/2" ϕ	8-12	10-14	15-18



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by periodic sludging and cleaning and some is simply lost in handling. The figures shown in Table 3 are based on reports from existing installations and are, therefore, at least approximately correct.

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The amount of dragout per net ton of wire produced is greatly affected by the size of the wire. This is understandable since all surfaces are coated with a film of at least .001" in thickness and the finer the wire, the greater the surface per pound of wire. It is also affected by the specific gravity of the salt and its fluidity or viscosity at the temperature involved.

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Despite its cost, however, the protection afforded the surface of the wire by this continuous film during exposure to the air for cooling or quenching, is a major factor in the over-all economy of the process.

Maintenance

Maintaining this type of equipment in efficient operating condition will, of course, require steady attention and some expense. Of prime importance is regular and enforced housekeeping. Covers must be in good condition to keep the efficiency high. Sludge must be removed from the furnace. (For the higher temperatures with chlorides, this should be attended weekly. For the nitrates, it is not necessary.) Drippings and general dirt should not be allowed to accumulate. Pyrometers should be checked periodically, and the electrical equipment inspected on occasion.

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With good general attention, however, there will still be some replacements and rebuilding required as the consumable parts of the equipment wear out. This will require a periodic shut down and the expenditure of some labor.

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Table no. 4 shows the expected life and an estimated cost per ton of this type of maintenance. The cost per ton has been calculated on the assumption that a two-turn operation, five days per week is involved and will not vary greatly with the size of the equipment.

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The life of the ceramic pot will depend on the electrode construction. It will be much longer with over-the-top type of electrode than with submerged electrodes. On the other hand, the life of the electrodes will vary in the opposite direction, and the over-all thermal efficiency of a submerged electrode furnace is definitely higher.

Limitations

The salt bath furnace, while it offers many valuable features, also, however, has some basic limitations which must be recognized.

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The principal one is that it is not possible to vary the temperature of the furnace during any one annealing cycle. Its use is limited to those applications where a constant temperature is involved. This is because the very considerable mass of salt it contains cannot economically be raised and lowered in temperature at frequent intervals. Such operation as full anneals, with controlled cooling within the furnace, for example, will rule out the salt bath furnace. This, however, does not imply that such a furnace may not be operated economically at several different temperatures for different types of work.

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Secondly, while scale is completely eliminated, the surface produced, for some applications, is not good enough. Process or intermediate anneals, therefore, are the rule and final anneals the exception for stainless steels or chrome nickel products where a truly bright surface finish is required.

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Even on carbon steels where the surface finish is excellent, the complete elimination of all greases or soap by the salt will make necessary some form of rust protection before shipment of finished product.

Descaling

Descaling, as the name implies, means the removal of scale from the outer surfaces of wire or rod. There are three processes in current use, all of them operating in fused caustic soda baths with chemical additions at temperatures below 1000°F. These are:

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The DuPont Process in which a highly active reducing agent, sodium hydride, is generated in a bath of fused caustic operating at 700°F to 750°F max. The scale is reduced to the original metal for most metals except chromium and in that case it is converted to a lower oxide. This process requires the addition of metallic sodium and hydrogen to the bath in order to generate sodium hydride.

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The Virgo Process developed by the Hooker Electrochemical Co. of Niagara Falls, New York. The operating temperature in this case is approximately 950°F and the action of the bath is to modify the scale by oxidation.

TABLE 4

Process Annealing

Maintainance Costs - (Pot-Electrodes-Thermocouple-Labor) $/net ton

5 days/week 2 Turns/day

Temp.	Expected Life			Over-all Cost
	Steel Pot	Ceramic Pot	Electrodes	#/net time
700 - 1150°F	indefinite	-	indefinite	negligible
1200 - 1325°F	3 years	-	3 years	$.26
1350 - 1800	-	2 to 8 years	2 years	$.73
1800 - 2150	-	1 to 3 years	1 to 2 years	$1.47

The "Kolene" Process which uses an oxidizing bath and electrolytic means for scale removal.

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These processes are well known and there are many installations in use. Their economic value is based on reducing greatly acid pickling time and costs, and on substantial saving in the metal loss of the product due to the action of the acid.

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In effect, this says that a descaling bath will pay where the product has a tightly adhering and acid-resisting scale. For this reason, they are used principally for stainless, or alloy steel products, nickel-chrome alloys and for titanium. Mild steel, copper brasses are not generally descaled in salt baths.

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The advantages of descaling process are:

1. **Reduction in metal loss.**
2. **Reduction in acid consumed.**
3. **Improved surface condition.**
4. **Reduced processing time.**

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The savings, by the use of this type of equipment, can be very great, sometimes they are several times the total cost of the operation since metal loss reduction as high as 4% of the treated weight are possible under favorable conditions. The furnace used for descaling will always have a steel pot. The method of heating can be electric by means of immersed electrodes, and gas by immersion tubes, or externally fired. There are many installations of both kinds in successful use and Figures 6 and 7 illustrate representative installations of the electrode type of furnace.

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On all descaling operations in salt, the work still requires acid treatments. Generally, the same acids at the same temperature are used before the descaling treatment. However, the time in the acid is tremendously reduced, seldom exceeding a very few minutes and sometimes being measured in seconds.

The over-all cleaning cycle is very much shorter and an important reduction in weight of material in process is obtained.

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Patenting

Patenting of high carbon steel wire is a very old and well known process. Interestingly enough, it predates by many years the work of Davenport and Bain on isothermal transformation of steel, even though in effect it is an austempering treatment. The wire is heated to a temperature well above the critical, then cooled rapidly, actually quenched in a liquid bath at temperatures ranging from 700°F to 1000°F where it remains for an appreciable length of time. It is then air cooled. Most of the installations in operation today use lead as the quenching medium. However, salt can be used with equal ease and there are some benefits to be gained by its use.

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Theoretically, there are good reasons why salt baths could be used for both the austenitizing and the quench operations as it would eliminate scale and reduce floor space. Up to the present moment, however, there are no such installations in service to the best of the speaker's knowledge. This is probably due to the difficulty in designing feeding and guiding devices to operate in salt at elevated temperatures for a satisfactory length of time.

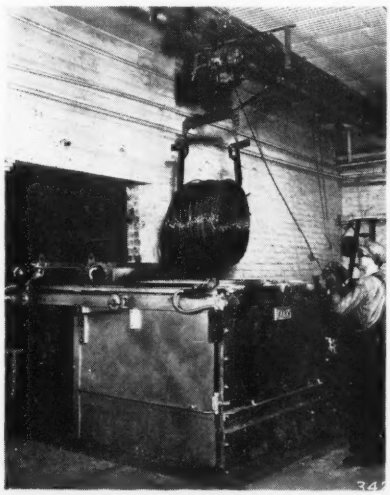

Figure 6.

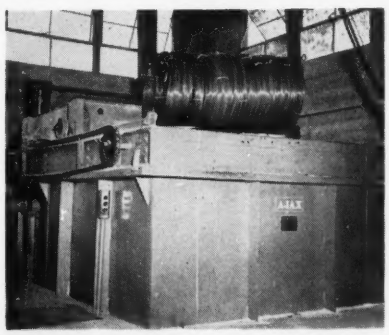

Figure 7.

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No such problems exist, however, in the quench bath and there are no reasons why they should not be adopted more widely.

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A highly successful unit of this type has been in operation in Wisconsin for some five years and some of the results secured will be of interest.

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The wire is heated in a 50 ft. gas-fired automatically-controlled continuous furnace which handles 24 strands at one time with a production of approximately 3000 pounds per hour. The temperature is controlled at 1775°F to 1825°F. Upon leaving this furnace, the wire immediately enters a salt quench furnace operating at 950°F to 1000°F. The length of the quench pot is 15 ft. 8½ in., the salt is 50% sodium nitrate and 50% potassium nitrate. The length of travel of the wire in the salt is approximately 13½ ft. and the speed of travel of the wire is as shown in Table 5.

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The installation is shown in Figure 8. You will note that the top of the furnace has pan-type covers. These can be adjusted to the production requirements so that the losses are always slightly greater than the heat carried into the furnace by the work. As a result, the power consumed during operation is practically negligible. However, the salt dragged out is appreciable. Table no. 6 gives operating results covering an extended period of time. Because the austenitizing furnace does not have a controlled atmosphere and no scale breaker is used on the wire at the delivery

in the spirit of

Monsieur Antoine deLamothe Cadillac

who founded Detroit in 1701

APEX

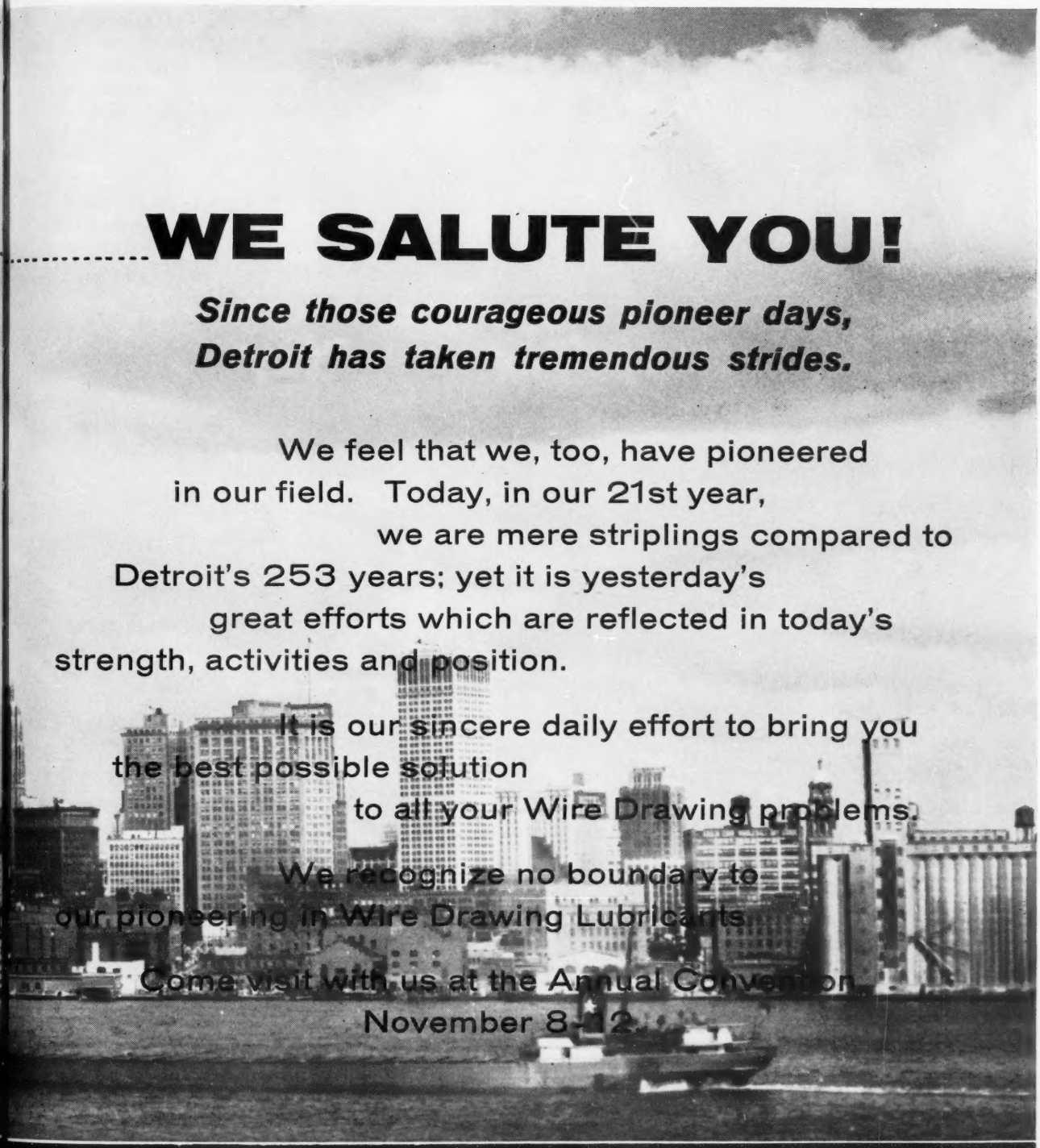
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TABLE 5

Patenting of Medium Carbon Wire

Austenitized at 1775 to 1825°F

Rate of Travel of Wire through Quench Bath

Size of Wire	Speed ft/Min.	Immersion Time
.070" - .085"	24	34 seconds
.086" - .100"	20	40.5 seconds
.100 - .115	17	48 "
.116 - .130	15	54 "
.131 - .145	13	62.5 "
.14 - .170	11	73.5 "
.171 - .195	9	90.0 "
.196 - .225	7	116. "
.226 - .290	3	2.5 minutes

TABLE 6

Wire Patenting

Salt Consumption in Quench Furnace

Wire Size	# Produced	Salt drag out #/net ton	Total Salt used #/net ton
.087 - .188	1,099,950#	15.3	23#
.104 - .230	288,600#	8.6#	15.2#
.120 - .218	294.000#	10.4#	14.9#

end, a substantial amount of scale falls to the bottom of the quench furnace. The periodic cleaning this necessitates, causes a substantial additional amount of salt to be consumed. This is shown in Table no. 6.

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This unit has greatly improved the uniformity of the patented wire over preceding practices. In addition, it has reduced the cost of operation because of its trouble-free performance and the elimination of a difficult cleaning step.

Special Applications

These can only be mentioned briefly. One covers the cleaning of low carbon steel wire in a fused caustic soda bath operating at 1400°F approximately, with the Tainton process where direct current is applied to secure electrolytic cleaning. The Bethlehem Steel Company's "Bethanized Wire" has utilized this process.

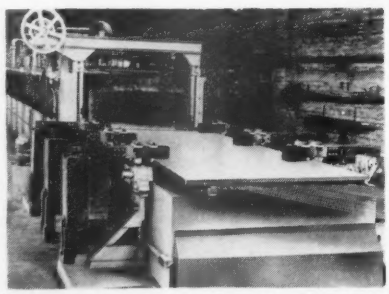

Figure 8. * * * * * * * *

A new application of salt baths should also be mentioned since it is of interest to the wire industry. It is the aluminizing process in which steel is coated with a ductile layer of aluminum. Several processes are currently under development in which salt bath furnaces are used for preheating and fluxing purposes. Generally, we are dealing with proprietory methods such as the GMC's "Aldip" or the "Moeller" process.

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For some atmospheres, aluminized wire will greatly out-perform galvanized wire and the cost of the process on a comparable production basis will, we believe, be equal to or only slightly higher than galvanizing. For these reasons, it is expected that aluminized wire will become a new and useful product in the industry.

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There are also some applications of solution treatment of nonferrous materials. These can only be mentioned briefly. The principal ones are the solution treatment of aluminum alloys. This is carried out at 920 to 970°F followed by a water quench. The conventional process anneal furnace can be used.

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It is also applied to copper chrome alloys where the operating temperature is high, about 1800°F or even somewhat higher. Special furnace designs may be involved in those cases.

Summary

Salt bath furnaces are an accepted production tool in the wire industry. The major advantages offered are:

1. **High production capacity per sq. ft. of plant occupied.**
2. **Much lower capital investment than any competing method.**
3. **Very short process time cycle.**
4. **Eliminate scaling without need of atmosphere gas plant.**
5. **Flexibility in design and use.**
6. **High quality product due to inherent temperature uniformity and ease of control.**

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Cooling of Steel Wire During Continuous Drawing

by Norman A. Wilson
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Morgan Construction Company
Worcester, Massachusetts

Introduction

With the trend toward higher wire drawing speeds in recent years, the problem of heat generation and its removal during continuous drawing has become a subject of considerable importance. In the absence of information of either empirical or analytical origin which permits quantitative study of this subject, an investigation was undertaken to establish a basis for predicting the temperature rise under specified conditions of drawing, and to determine the empirical cooling rates which can be achieved with various arrangements of cooling air. This investigation has produced noteworthy and beneficial results. Improved air-cooling facilities incorporated in the Morgan-Connor Wire Drawing Machines of recent construction permit higher drawing speeds than were previously possible on quality high carbon wire, and still further improvement is in sight for the future as further utilization is made of the newly defined principle. This paper is a report of the investigation.

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As the wire passes through a wire drawing die, heat is generated which raises the wire temperature. On an ordinary drawing frame for single drafting, the heat generation is not a serious problem. Here the drawing speeds rarely exceed 300 F.P.M. and the wire has an opportunity to cool between drafts. However, on continuous drafting, particularly with finishing speeds exceeding 300 F.P.M. the heating of the wire will be cumulative, frequently resulting in a temperature rise which is detrimental to the quality of the wire. The heat resulting from wire drawing has little or no effect on low carbon wire, but the toughness, uniformity, tensile strength, ability to meet high twist test specifications and other mechanical properties of high carbon wire can be seriously affected. It is evident, therefore, that in order to produce a uniformly high quality, high carbon wire at any drawing speed, it is necessary to provide adequate cooling.

Norman A. Wilson

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The drawing of wire is a cold working process in which the wire is subjected to plastic deformation by the combination of a tensile force applied to the wire in a longitudinal direction and of compressive forces in a radial direction caused by the reaction forces as the material passes through the die. The power required to produce the plastic deformation and to overcome the frictional forces present between the wire and the die is defined by the following equation in terms of fundamental, mechanical and geometrical factors:

$$HP = P\left(1 + \frac{\mu}{\tan\alpha}\right) A_2 \frac{(E-1)\,V}{33{,}000}$$

μ = COEFFICIENT OF FRICTION
α = ANGLE OF INCLINATION OF DIE WALL
A_2 = LEAVING AREA
V = SPEED LEAVING DIE, F.P.M.
$(E-1) = \frac{R}{100-R}$, R = % REDUCTION
E = ELONGATION OF WIRE IN PARTICULAR DRAFT CONSIDERED
P = NORMAL PRESSURE

Fundamentally, most of the work performed in accomplishing a given reduction is transformed into internal and external heat within the wire and die. However, the exact proportion of the work of deformation converted into heat within the wire is not known for the present commercial drawing speeds. Eichinger and Lueg[1] have investigated this problem at low drawing speeds of 28 F.P.M., but no such study has been made at commercial drawing speeds.

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The effect of drawing speed on the wire temperature rise was not known. Theoretically, the die pull required for a given reduction, die shape and the composition of wire is independent of speed, while the horsepower and weight of wire

Numbers refer to bibliography.

drawn varies directly with speed. All the available data indicates that the ratio of horsepower to weight remains practically constant regardless of speed within the wire drawing speed range. Therefore, it is assumed that the temperature rise of the wire should remain nearly constant regardless of speed for given drawing conditions. It is assumed that the coefficient of friction is constant over the range of drawing speeds to be covered by this investigation.

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The Morgan-Connor Wire Machine, which is familiar to all of you, is a multiple block, non-slip, continuous wire drawing machine of the accumulation type, employing a dry lubricant and using air as a wire cooling medium. A large volume of air is blown on the wire at the draft line, through the internal cooling fins of each drawing block and through and around the coils of accumulated wire on the blocks. The combination of air-cooling and the time delay between drafts due to the accumulation of wire on each block effectively removes the heat developed in the wire at drawing speeds in use at the present time. However, the effectiveness of the air distribution inside and outside the block, cooling rates in relation to air volume and the desirable air velocity had not been determined quantitatively. Therefore, data was not at hand for the design of an efficient air-cooling system for higher drawing speeds and for today's requirements of more rapid cooling.

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The principal criterion of adequate wire cooling is the ability of the finished wire to meet the required physical specifications. However, in order to provide an adequate and economical air-cooling system capable of producing high quality high carbon wire under varying atmospheric conditions and at high finishing speeds, it is necessary to know the percentage of drawing energy converted into the heat in the wire, the effect of air volume and velocity on the physical properties of the wire at varying drawing speeds and the effect of speed on wire temperature rise. For these reasons the following described investigation was conducted.

Description of Equipment and Test

In order to secure data that would be directly applicable to the design of the air-cooling system of a wire machine, this investigation was conducted in a wire producing plant on a production wire machine. Insofar as possible, it was conducted under normal production conditions. The machine was operated in the normal manner by a production operator. The material was prepared for drawing in accordance with standard practice. The finished wire was subsequently processed in the normal manner, provided it passed the physical test. The departures from the standard practice will be described later.

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The machine used for this investigation was a Morgan-Connor, 7-Block, Type "BW" Continuous Wire Drawing Machine, Serial No. BW-384, as shown in Figure 1. The machine was driven by a 200 H.P., 1200 R.P.M., 3 phase, 60 cycle, 550 volt, wound rotor motor through a three-speed reducer with available finishing speeds of 600, 900 and 1200 F.P.M. This machine was equipped with four (4) 22″ diameter intermediate blocks and three (3) 22″ diameter stripper or finishing blocks. With the addition of a top dome and tube guide, the three stripper blocks can be converted to intermediate blocks. The stripper blocks are similar in construction to the intermediate blocks, but are provided with four radial slots to permit the use of a bundle stripper which removes the coil of wire when the block is full.

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These drawing blocks are geared to give an increase in speed from block to block towards the finishing end of the machine. The increase in speed from block to block provided by the gearing is slightly less than the increase required to compensate for the wire elongation under the minimum reductions for which the machine is to be used. As the result, there is a slow accumulation of wire on each of the blocks. The wire as required for each block is uncoiled from the top of the accumulation and passed over the top dome, down through the guide tube into the stationary block center and then by means of guide sheaves into the next die. Each block is equipped with a disconnect clutch so that the individual blocks can be stopped periodically to run down the accumulation. The application of air to the drawing blocks for the purposes of cooling the wire has been previously described.

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Normally the cooling air was

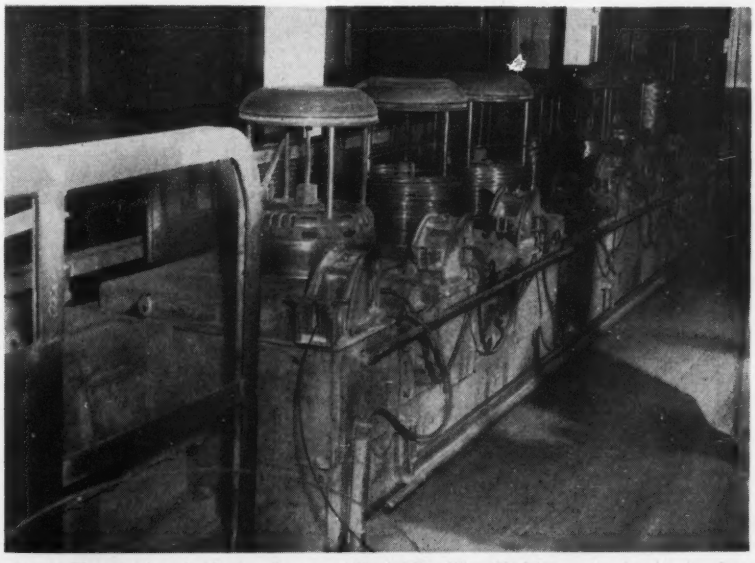

Fig. 1—Photograph of Morgan-Connor 7-Block BW Wire Machine. * * * * *

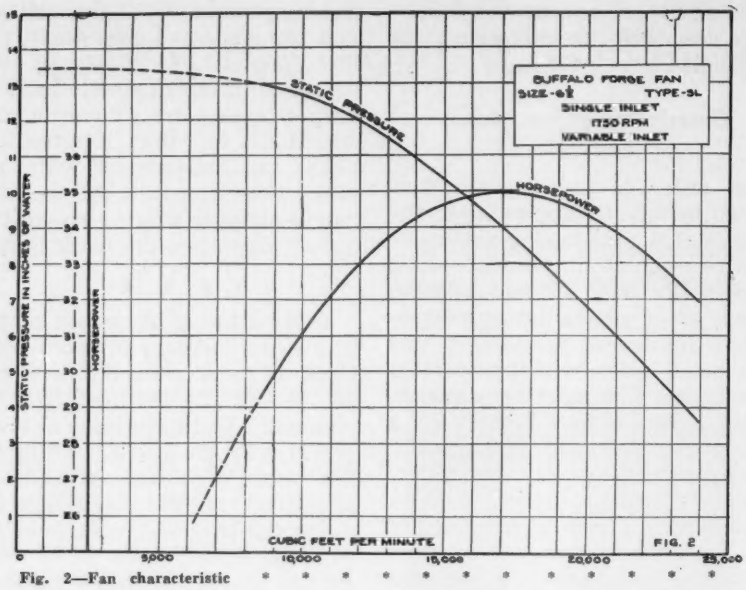

Fig. 2—Fan characteristic

supplied to this machine by a Buffalo Forge Fan, Size 3, Type "LLD" but for this investigation the original fan was replaced by a Buffalo Forge Fan, Size 6½, Type "SL", variable inlet fan. The fan was driven by a 40 H.P., 1750 R.P.M., 440 volt, 3 phase, 60 cycle, totally enclosed, fan-cooled motor and controlled from a separate pushbutton station. Figure 2 shows the characteristics of this fan.

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For this investigation a .245" diameter, air patented, .70 carbon rod was drawn 7 drafts to .090" diameter rope wire. This rod had a nominal composition of .70C—.95Mn—.040S—.016P—.17Si and a starting tensile of 150,000 p.s.i. by test. The rods were coated with borax and wetting agent after patenting and cleaning. The specifications of the finished wire required a tensile strength of 250,000 to 265,000 p.s.i. and withstand 25 torsions in 8 inches. The tensile test was made on a standard testing machine. For this investigation, Miller's No. 76 (Stearate Base) drawing compound was used. The dies, in all cases, had a 16° approach angle and a 30° back relief angle with 50 to 75% bearing length.

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The temperature of the wire entering and leaving each die was measured by means of a contact thermocouple and a Leeds & Northrup potentiometer. The contact thermocouple is made by silver soldering an iron-constantan thermocouple wire to a steel strip .010" thick by .060" wide and approximately ⅛" long. The thermocouple is threaded as shown in Figure 3, Sketch A, through an asbestos block and aluminum pin and the holder. The aluminum pin was backed by a light appliance motor brush spring which kept the thermocouple in contact with the wire at all times and maintained constant friction between the wire and thermocouple. The pickup was held against the wire by hand. Throughout the course of the investigation, observations were made to determine the effect of friction on the observed temperatures. This was done by stopping the machine after a steady temperature was reached and observing the change in temperature. Each time the temperature decreased at a uniform rate and not with a sudden change followed by a uniform decrease. This would indicate that the observed temperature was not preceptibly affected by friction.

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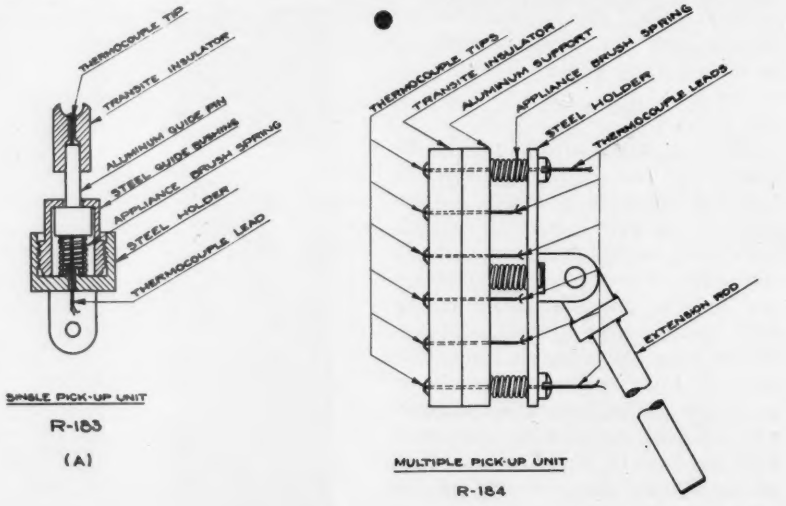
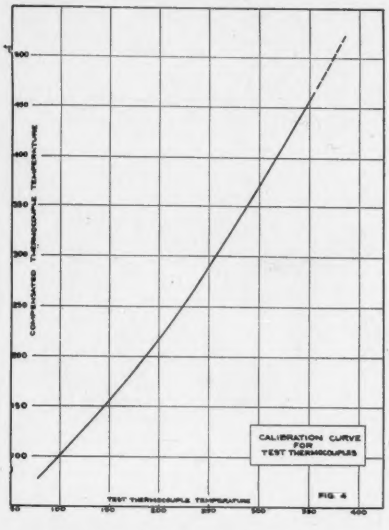
It was realized that a large error might be caused by the heat loss from the thermocouple into the transite block, thus preventing the thermocouple from reaching the temperature of the wire. In order to minimize this source of error, the thermocouple pickup was calibrated against a compensated thermocouple having an expected accuracy of approximately 1%. The compensated thermocouple used is the one described by Lewis & Godfrey[5] in their paper "Back-pull Wire Drawing." In a compensated thermocouple, heat losses are prevented by applying to the exposed sides of the thermocouple sufficient heat to prevent any heat flow through the thermocouple. With the absence of a temperature drop from the surface to the thermocouple, the true temperature of the surface should be obtained. The calibrating compensated thermocouple consisted of a hollow



THERMOCOUPLE PICK-UP MOUNTINGS

Fig. 3.

copper cylinder through which the drawn wire passed, a detecting thermopile and measuring thermocouple. The copper cylinder was heated by a resistance winding controlled by a variable transformer. The rate of heat transfer between the cylinder and the wire was determined by the thermopile, consisting of ten thermocouples in series with their hot and cold junctions arranged to detect any radial temperature gradient within the copper cylinder. The temperature of the copper cylinder was adjusted until a galvanometer was balanced indicating the absence of a temperature gradient. The temperature observed in the measuring thermocouple then represents the surface temperature of the wire. The results of a sample calibration, which was made after the completion of the test are shown in Figure 4. While the accuracy of this method is very high, it is not particularly suited for extended field test because of the difficulties of mounting and the time required to balance the heat flow.



To be certain that the silver solder and steel strip did not affect the calibration of the iron-constantan thermocouples, the test thermocouples were calibrated against a standard iron-constantan thermocouple and a bulb thermometer in a bath of oil. The results indicate that up to 213°F, the maximum expected variation in thermocouple readings was in the order of 1% which was acceptable. The thermometer bulb readings were about 4% lower than the thermocouples. This may have been due to the fact that the thermocouples were located at the tip of the thermometer bulb nearer the source of heat and reflected a temperature gradient in the oil bath which was not eliminated by stirring.

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The wire temperatures on the block were obtained by means of a multiple pickup shown in Figure 3, Sketch B, the thermocouples being the same as described above. This unit was held by a Brown & Sharpe Magnetic Base Stand and mounted on the machine cover plates so that the backing strips were compressed slightly and as many thermocouples as possible are in contact with the wire on the block. The number of thermocouples in contact with wraps of wire on each block vary from 2 to 5, depending on the wire diameter. Recently, we have designed a new pickup as shown in Figure 5. This employs a single spring back thermocouple surrounded by a felt shroud. By using a shroud, the thermocouple is shielded from the cooling air thus reducing the observed error.

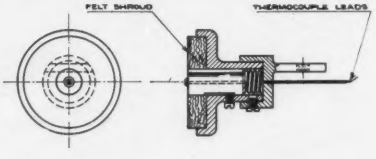

FIG. 5
SHROUDED THERMOCOUPLE PICK-UP MOUNTINGS

The wire temperatures entering and leaving the die were measured in dies 2 through 7. The temperatures of the wire on the blocks were measured on blocks 2 through 6. Finishing block temperatures were not measured because of the difficulty in keeping the multiple pickup in contact with the wire. Each time the machine was stopped the loops of wire would relax and lap over, pushing the pickup away from the block immediately after starting.

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A complete temperature survey was made for each block separately. The multiple pickup was mounted on the machine covers 90° from the point at which the wire contacts the block. The wrap number and contact with each thermocouple was recorded. The machine was then run for a short period of time before the fan was started. Readings were made continually until uniform conditions were reached which occurred in approximately ten minutes. Prior to stopping the machine to move the pickups, the fans were stopped to prevent excessive cooling of the wire during the down time.

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All thermocouple leads were connected through a Leeds & Northrup 10 point rotary switch to a Leeds & Northrup 0 to 1000°F. iron-constantan potentiometer indicator.

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The cooling fan, venturi meter, and duct were located in the basement directly below the machine as shown schematically in Figure 6. The total air volume was measured by means of an 18" by 13" venturi meter and a differential water manometer. The total volume of air delivered by the fan was calculated from:

$$Q = 1308 \frac{P}{\rho}$$

where

Q = Volume of air in cubic feet per minute.

P = Differential pressure in inches of water

ρ = Weight of air in lbs. per cubic ft. corrected for temperature and pressure.

At each drawing speed tests were made with three different rates of air flow, nominally 7300, 12,500 and 17,500 C.F.M. respectively.

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The velocity head at the openings of the skirt of each block was measured by means of a pitot tube and an open ended manometer. The value of velocity head recorded was an average of several readings taken at various openings around the skirt. The manometer contained Meriam's Red Oil with a specific gravity of .827. The average air velocity for each block was calculated from:

$$V = 1096.5 \sqrt{\frac{P}{\rho}}$$

where

V = Velocity of feet per minute.

P = Pressure in inches of water.

ρ = Weight of air in lbs. per cubic foot corrected for temperature and pressure.

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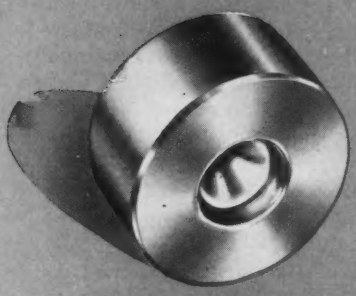
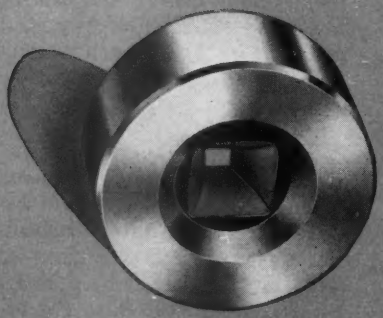
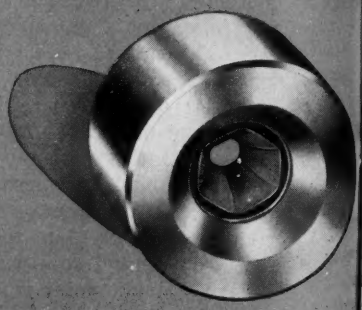


Round-Hole Dies

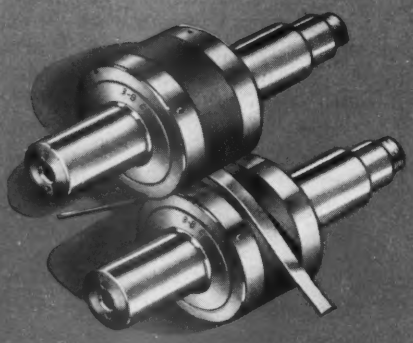


Square-Shape Dies

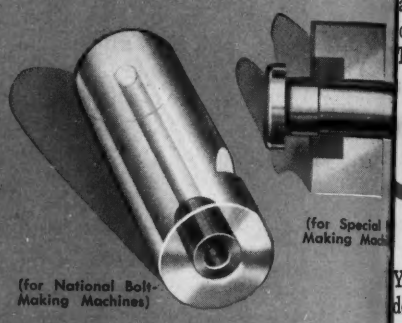


Hex-Shape Dies

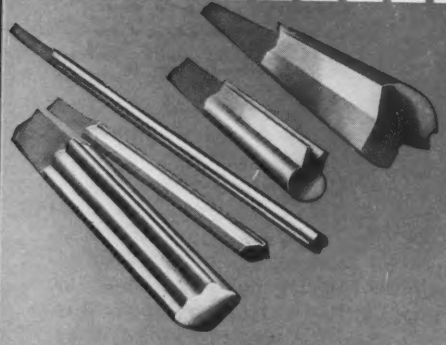
Capstan Rings



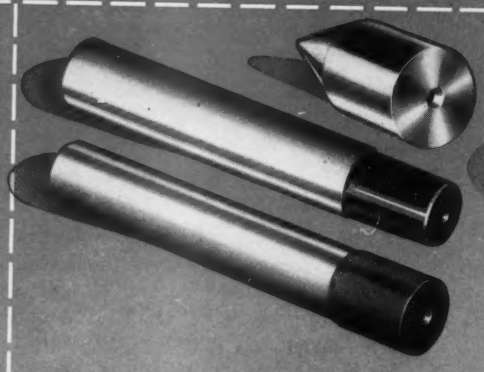
Wire-Flattening Rolls



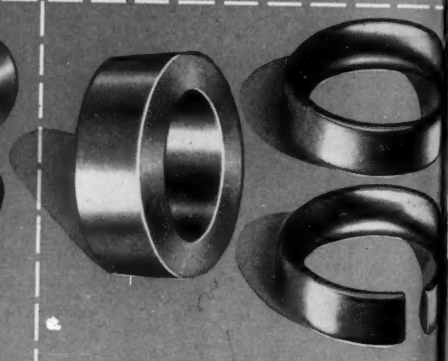
Extrusion Die Nibs



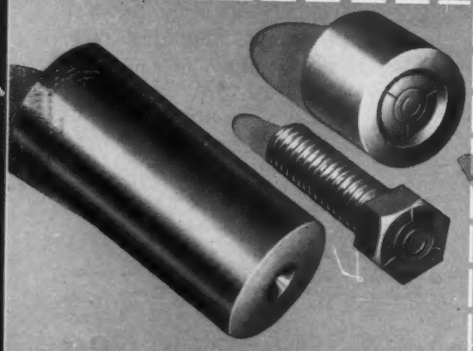
Special-Shape Dies



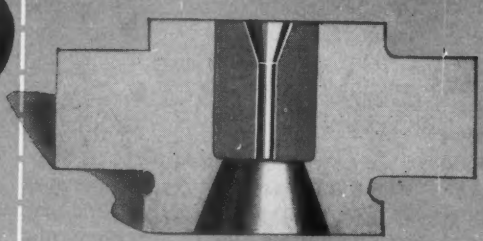
Mandrels and Mandrel Nibs



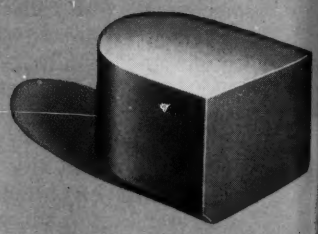
Bushings, Rings and Slotted Wire Gu



Header Die Nibs and Heading Hammers



Welding Rod Coating Dies



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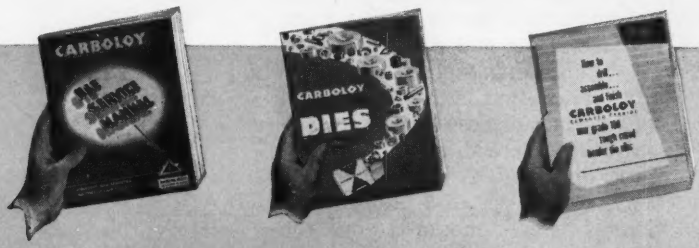

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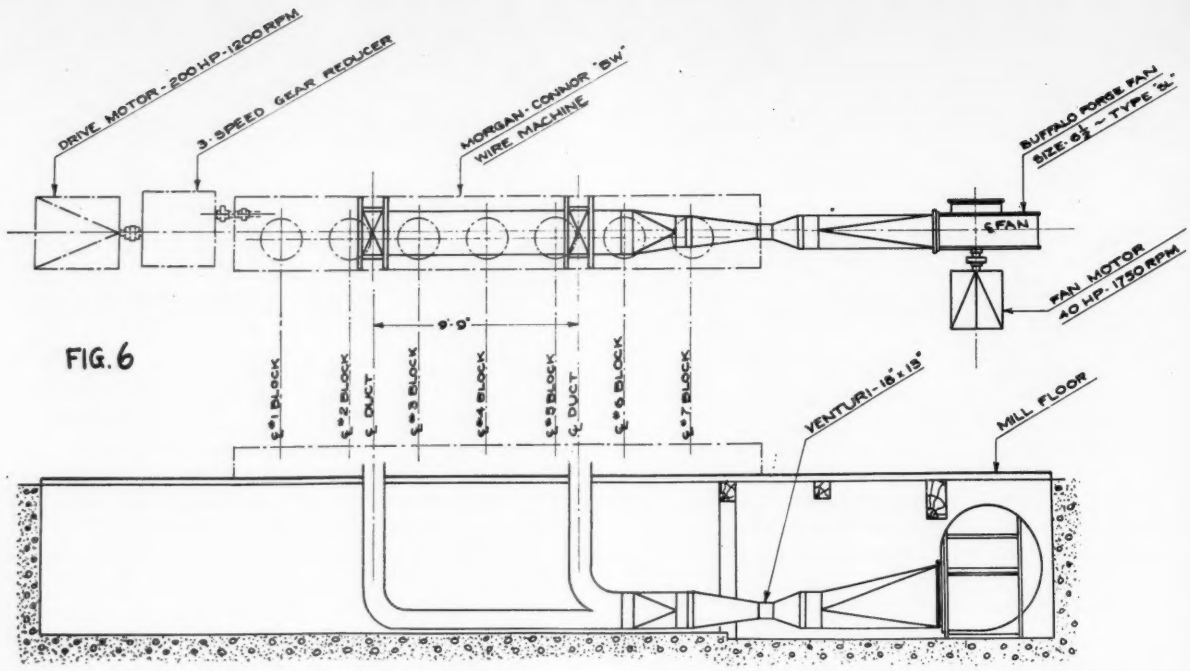

Fig. 6—Schematic arrangement of air ducts.

To determine the amount of heat removed from an individual die and all the dies collectively by the die cooling water, the water temperature entering and leaving the die was measured by thermocouples inserted in the water lines. The flow rate was determined by obtaining the increase in weight of a 5 gallon container and observing the time required for filling.

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The die pull at each die was determined by measuring the reaction of the swing support bar on a compression stud located in the vertical cast adjustment opening as shown in Figure 7. The compression stud was made from a ¾" by 3" long square head setscrew as shown in Figure 8. The end of the setscrew was flattened and turned to a diameter of .500" for a distance of .625" along the body. Two Type A-7 SR4 Strain Gauges were mounted on the turned portion and connected in series. Gauge leads were then imbedded below the roots of the thread in a 1/16" slot running along the axis of the screw to the head. This permitted the stud to be inserted in the die box without cutting the wire and removing the soap box. The compression stud was calibrated, Figure 8, on the 10,000 lb. Olson Testing Machine in the mechanical engineering laboratory at Worcester Polytechnic Institute. The output of the gauges was recorded by a General Electric Photoelectric Recorder through a Type K Strain Indicator.

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During this investigation the finishing speeds were 600, 900 and 1200 F.P.M. The total air flow was varied from 7300 to a maximum of 17,500 C.F.M. The air distribution of the machine for all tabulated tests was at 25% of the total volume of the air passing through the block skirts and the balance through the inside of the blocks.

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For all tests the following variables were observed and recorded:

Wet and dry temperatures.
Air temperatures (Fan inlet).
Pressure difference (Venturi).
Air velocity head (Block Skirt).
Air temperature leaving block skirt.
Room temperature.
Wire temperature entering and leaving die.
Wire temperature on block.
Number of wraps corresponding to each block temperature.

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In addition, torsion and tensile specimens were taken from the

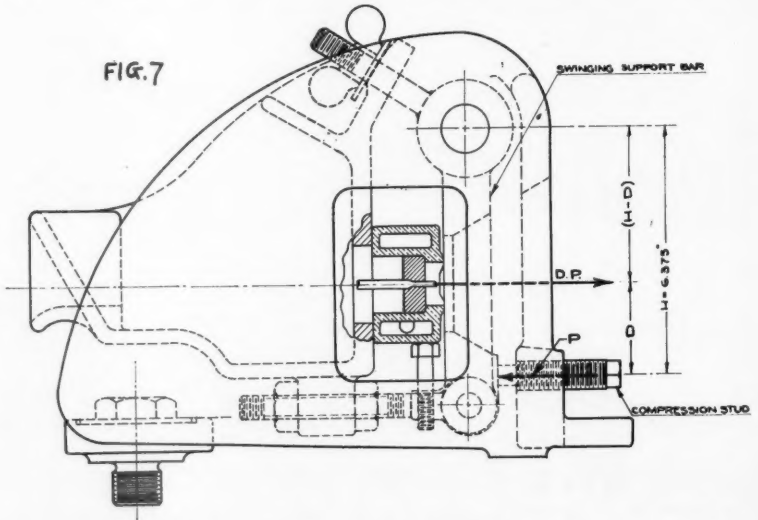
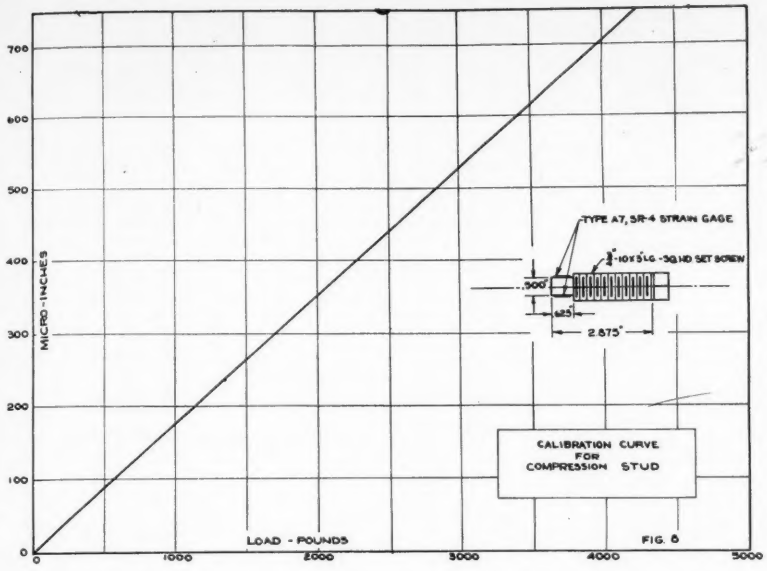


Fig. 7—Schematic arrangement for measuring die pull.



front and back ends of four bundles of wire during each test.

Results

In order to illustrate the effect of speed and air volume on wire temperature, the wire temperatures entering and leaving each die with 7300, 12500 and 17500 C.F.M. of cooling air have been plotted against finishing speed as shown in Figure 9. Finishing speed was selected as the abscissa in lieu of the actual speed at each draft for convenience and because the speed at each draft is in direct proportion to the finishing speed. It can be readily seen that the increase in entering and leaving wire temperatures is approximately equal for each draft and is proportional to the increase in finishing speed regardless of the volume of cooling air.

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For a constant finishing speed, increasing air volume decreases the temperatures entering and leaving the die, but does not affect the average temperature rise. In some cases, the entering and leaving temperatures were higher for increased air volume, but this was due to variation in accumulation of wire on each block from test to test in addition to the effect of the factors previously mentioned. The temperature for the most part showed the greatest decrease when the air volume was increased from 7300 C.F.M. to 12,000 C.F.M. This would indicate that for most operating conditions the optimum air volume is greater than 12,000 C.F.M. of air.

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The theoretical temperature rise was calculated from the following equation:

$$T = \frac{.0001069P}{h A_2 \rho}$$

A_2 = Leaving area, square inches.

P = Die Pull in Pounds.

h = Specific heat of steel = .115

ρ = Density of steel, pounds per cubic inch

The above equation can be easily derived by equating deformation horsepower and the heat balance formula. The average temperature rise is within 12% of the theoretical temperature rise. This agrees very well with the results reported by Eichinger and Lueg. Their work indicated that with patented .6% carbon steel wire drawn at 28.2 feet per minute, 80% of the heat equivalent of the drawing energy was converted into heat in the wire, 10% of the heat was retained in the die and the balance remained as latent heat in the wire. At higher drawing speeds, they perhaps would have found a greater percentage of the heat retained in the wire.

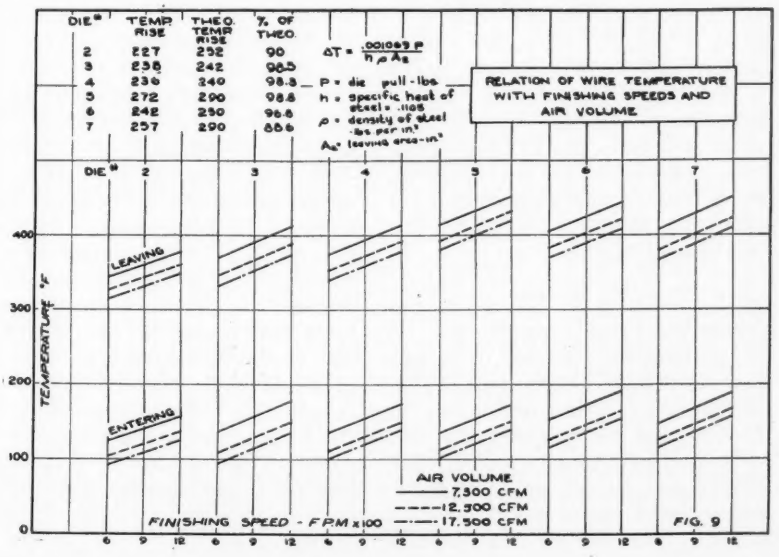
★ ★ ★

The variations in the temperature rise, among repeated observations under ostensibly constant conditions, can be attributed to variation in composition, rod coating, lubrication, die shape, and starting tensile. The effect of these factors cannot be evaluated independently. However, the great-

TABLE 1

			AIR VOLUME-CFM		
			7,300	12,500	17,500
600 F.P.M.	TENSILE STRENGTH		261,000	258,000	256,000
	TORSIONS	MAX.	31	33	33
		AVE.	26	27	28
		MIN.	29	31	31
900 F.P.M.	TENSILE STRENGTH		269,000	264,000	256,000
	TORSIONS	MAX.	29	33	33
		AVE.	23	23	28
		MIN.	26	28	31
1200 F.P.M.	TENSILE STRENGTH		267,000	261,000	257,000
	TORSION	MAX.	32	32	34
		AVE.	23	27	30
		MIN.	29	29	31

Relation of tensile strength and torsions with speed and air volume


DIE # TEMP RISE THEO. TEMP RISE % OF THEO.
2 227 252 90
3 238 242 98.5
4 236 240 98.3
5 272 290 98.8
6 242 250 96.8
7 257 290 88.6
ΔT = .001069 P / h ρ A2
P = die pull - lbs
h = specific heat of steel = .1105
ρ = density of steel - lbs per in³
A2 = leaving area - in²
RELATION OF WIRE TEMPERATURE WITH FINISHING SPEEDS AND AIR VOLUME
LEAVING
ENTERING
TEMPERATURE °F
AIR VOLUME
7,300 CFM
12,500 CFM
17,500 CFM
FINISHING SPEED - F.P.M. x 100
FIG. 9

est source of error in the original data is that possibly the peak temperature was not obtained for each condition.

★ ★ ★

Based on the observations of air distribution to each block, air velocity and wire temperatures leaving the die and on the block, a qualitative overall heat transfer coefficient was determined. This co-efficient is based on the original observations. As described previously, the temperature of the wire on the block was obtained by means of a multiple thermocouple pickup. These thermocouples were subject to the same error previously described for the single thermocouple pickup with an additional error introduced by the cooling air passing directly over the pickup. On account of the location of the pickup and the varying air volume used throughout the test, it was considered impossible to devise a method of calibration that would duplicate the test conditions. Therefore, the result obtained is a heat transfer coefficient which is used as a guide in the design of air-cooling systems.

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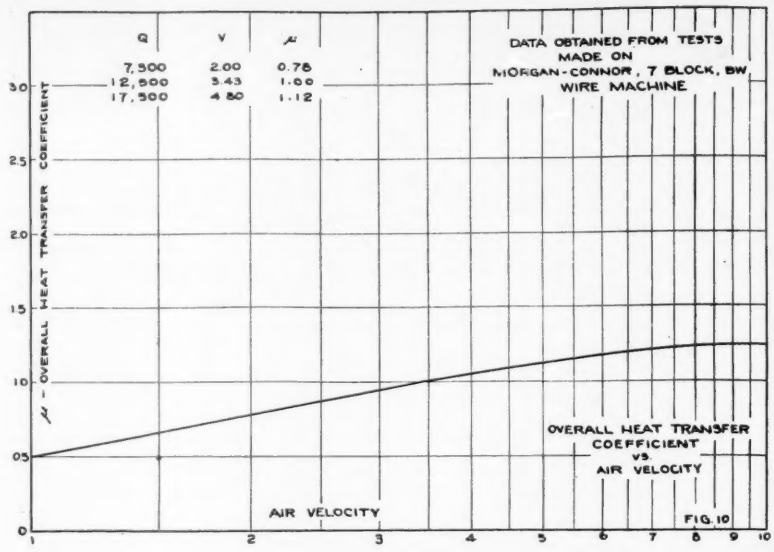
Figure 10 shows the qualitative relation between the heat transfer coefficient and air velocity out of the block. The values assigned to the ordinates indicate relative but not absolute values. The coefficient increased with increasing air velocity up to a maximum value of 1.25 at approximately an air velocity of 9. At a velocity of 5, the coefficient is approximately 82% of the maximum value and any further increase in velocity represents a small increase in the coefficient. This indicates that the optimum air velocity is approximately 5 for this type of machine under the test conditions.

★ ★ ★

From the table on Figure 10, the coefficients for the air capacities of 7300, 12500 and 17500 C.F.M. used in this test would be .78, 1.00 and 1.12 respectively. The wire temperatures entering and leaving the die decreased approximately 25°F. as a result of a .22 increase in coefficient when the air



volume was increased from 7300 to 12500 C.F.M. An increase in capacity from 12500 to 17500 C.F.M. resulted in a temperature decrease of approximately 14°F. with a .12 increase in cofficient. The decrease in temperatures with increasing air volume is inversely proportional to the increase in coefficient.

★ ★ ★

It is considered important not only to limit the maximum wire temperature at any draft, but to lower the temperature of the wire as quickly as possible after leaving the die. As a basis of comparison, a cooling rate was established by determining the time in seconds required to lower the wire temperature to 200°F. and dividing the temperature drop by the time to obtain a cooling rate in degrees F. per second. At a constant finishing speed of 1200 F.P.M. and the three test volumes of air used: 7300, 12500 and 17500 C.F.M., the wire reached 200°F. in an average time of 17.8, 12.4 and 10.8 secs. respectively. This represents a cooling rate of 7.7, 12.3 and 14.5 degrees F. per second. You will note that the ratios of the differences in time and cooling rate are approximately identical to the corresponding ratios obtained with the heat transfer coefficients. With constant air volume and decreasing finishing speeds, the cooling rate increased inversely to the speed.

The results reported thus far have been based upon an air distribution of 25% of the total air volume passing through the block skirt and the balance through the inside of the block. Since the most effective method of rapidly cooling a hot body is to apply a cooling medium directly to it, it was decided to investigate the effect of varying the air distribution between inside and outside the block. The percentage of the total air volume passing through the block skirt was varied from 25% to 100%. For a constant finishing speed and air volume, increasing the percentage of the total air volume through the block skirt resulted in a further decrease in the entering and leaving wire temperature and an increase in the cooling rate. This is accounted for by the increase in the heat transfer coefficient resulting from the increase in air velocity. For any given percentage of the total air volume passing through the block skirt, the change in temperatures and cooling rate were affected similarly as previously reported for any change in total air volumes.

★ ★ ★

It is recognized that the most effective cooling occurs when air is in contact with the wire on the block face. However, heat is transferred to the block by conduction at the line of contact between the wire and the block face. On account of the small area of contact be-

tween the wire and the block face compared to the wire area exposed to the cooling air, the amount of heat transferred to the block is similarly small compared to the heat removed by the cooling air. However, the heat carried into the block will gradually increase to a point that operational difficulties will occur such as bearing failures and the wire snapping up the face of the block. Therefore, it is necessary to apply 25-40% of the total volume of air on the inside of the block primarily to prevent operational difficulties and secondarily to cool the wire.

★ ★ ★

For this grade of wire, the specifications require a finishing tensile of 250-265,000 p.s.i and a minimum of 25 torsions in 8 inches. In Table I are listed the results of tensile and torsion tests of a minimum of sixteen samples for each condition of speed and air volume. The results show that for a constant finishing speed, increasing air volume decreases the finishing tensile and increases the number of torsions. With increasing finishing speed, the time available to cool the wire is reduced, therefore, it is necessary to increase air volume to produce acceptable wire. Without a proportionate increase in air volume with increasing speed, the tensile strength will increase and the number of torsions will materially decrease. Under the test conditions a minimum of 12500 C.F.M. of air was required to produce acceptable wire at any finishing speed within the range of the machine. At 17500 C.F.M. the wire exceeded the minimum torsion requirements by 6 and the tensile was comfortably within the specified range.

★ ★ ★

Previous to this investigation, it had been possible to produce consistently satisfactory .090 diameter high carbon wire from .245" diameter rod on this machine at 600 F.P.M. finishing speed and occasionally at 900 F.P.M. during the winter with the 7300 C.F.M. of air originally provided. During this investigation, consistently satisfactory high carbon wire was drawn at 1200 F.P.M. with 12500 C.F.M. at an ambient air temperature of 90°F. With 17500 C.F.M. of air consistently satisfactorily high carbon wire of this diameter will be produced at 1200 F.P.M. with ambient air temperatures of 100-110°F. The inherent high efficiency of air cooling can be increased further at any ambient air temperature by increasing the moisture content of the air up to the saturation point.

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Since the completion of this investigation, all of the Morgan-Connor Continuous Wire Drawing Machines designed for drawing high carbon rope wire from #5 rod or larger have been equipped with fans capable of delivering 17500 C.F.M. of air and in some cases as high as 24000 C.F.M. depending on the proposed drafting schedule and the ultimate location of the machine. The field reports received from the users of these machines have been very gratifying. In one installation, drawing .090 diameter high carbon rope wire of chemical analysis similar to the one used in this investigation, the finishing speed has been increased from 900 F.P.M. to 1500 F.P.M. In another installation, the .091 rope wire showed more uniform tensile and a 60% increase in torsions compared to wire produced on older machines at the same speed employing the same drafting schedule but with a small volume of air.

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It was mentioned previously that observations were made to determine the amount of heat removed from the dies by the cooling water. It might be of interest to know that approximately 1% of the total heat generated by this drafting schedule was removed by the die cooling water. This does not mean to suggest that this would be the case in every installation. The amount of heat removed from the dies by the cooling water is influenced considerably by the salts deposited by the water on the walls of the die holder.

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In conclusion, the results indicate that the temperature rise of the wire in passing through a die is not influenced by speed or cooling, but is influenced by the condition of the dies, lubrication, rod coating, composition and properties of the wire and the amount of reduction. However, inadequate cooling after a preceding draft will break down the lubricant, resulting in an increase in the coefficient of friction and a correspondingly greater temperature rise.

★ ★ ★

The measurements of temperature rise and die pull indicate that approximately 90% of the drawing energy is converted into heat in the wire. Since the B.t.u. heat content per pound of wire drawn is constant regardless of speed and the time available to remove it decreases directly with increasing speed, it is essential to have the cooling rate as high as possible in order to produce uniformly high quality high carbon wire. To do this effectively, the correct volume of air must be supplied at the optimum velocity at the draft line for the given conditions of drafting and finishing speed.

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To attain the forementioned conditions and to provide a uniform distribution of air among the blocks economically, the air-cooling system should have a minimum of resistance. A system that has proven effective is so arranged that the fan delivers air into a plenum chamber located directly below the machine, the machine forming the top of the plenum chamber. The air passes from the plenum chamber through the base of the machine into the drawing blocks. This arrangement will reduce the size of the fan and the fan motor rating.

★ ★ ★

The validity of these conclusions as applied to Morgan-Connor Continuous Wire Machines has been effectively demonstrated by the improved quality of the high carbon wire and the increased production in the field.

BIBLIOGRAPHY

1. **"The Heating-Up of Wire and Die in Cold Drawing" by Anton Eichinger and Werner Lueg; Mitteilungen aus dem Kaiser-Wilhelm Institut fur Eisenforschung, 1941, Vol. 23, No. 2**

(*Please turn to page* 1253)

The Application of Wire and Cable to a Wire and Cable Plant

by Philip J Croft, Chief Engineer
Canada Wire and Cable Company Ltd.
Toronto, Ontario, Canada

In this paper the author tells how wire and cable plants should make use of their own products in circuiting their plants for efficient operation. The paper was prepared for presentation at the Annual Convention of The Wire Association in Detroit on November, 10, 1954.

Much has been said in levity concerning the phenomenon of the cobbler's barefoot children, sometimes in reference to social conditions in which the cobbler cannot afford shoeleather for his own offspring, but more often in reference to cobblers in all walks of life who find themselves too busy making shoes for the trade to make them for their own children.

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This lamentable situation may occur figuratively in almost any industry, and in one as old-established as the wire and cable industry, it may not be altogether surprising if systems of plant power distribution installed 25 or 30 years ago are still in operation today, unchanged except for Topsy-like additions to copper-section in already well-filled wireways. In the Toronto works of the wire and cable manufacturing organization with which the writer is associated, this was the situation for many years; but within the last two or three years, a very considerable expansion programme, necessitating a very general re-arrangement of the flow lines throughout, coupled with the radical revisions in electrical plant occasioned by a change in supply frequency from 25 to 60 cycles, has imposed the necessity, (or perhaps one should say provided an opportunity) for a "new look" at the power distribution system within the plant and the various types of wire and cable of which it consists. Since the considerable amount of re-circuiting and re-wiring which has been done has afforded opportunity for some of the newer types of cable, particularly aluminum-sheathed cable, some account of it may well be of interest to members of this Association.

Operating Conditions in Wire and Cable Plants

It may be well first to characterize the conditions of operation in wire and cable plants insofar as they affect the successful functioning and long life of power distribution apparatus, especially wire and cable.

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In such plants as the one under consideration, in which all or many of the operations employed in the manufacture of a full range of wire and cable products from the highest voltage power cable to the finest enamelled magnet-wire, are carried on at the one site, a wide variety of operating conditions may be encountered, some of them requiring careful selection of suitable wiring materials to insure trouble free service. At the particular plant under consideration, until recently, wire rope was also manufactured at the same location; but this operation has since been physically removed to a new location in another town. Here again, the physical upheaval has made possible a general revision in the power distribution system, and the use of new and improved materials.

Heat, Oil, and Vibration

Relatively heavy and relatively high speed machinery, such as continuous drawing machines, and particularly those machines in which rotating masses may not always be critically balanced, such as high speed stranders and bunchers, present the problem of mechanical vibration which may cause difficulties in the wiring to the machines, though in machinery of the most modern type this is notably reduced by improved design. Vacuum pumps and pressure pumps, as used in cable impregnating and sheathing rooms may also be fruitful sources of vibration, and though equipment of this type is commonly spring-mounted, a suitable flexible connection to some nearby fixed point is a necessary condition of the electrical wiring to the driving-motors.

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High room temperatures are a normal and a necessary condition of operation in certain phases of wire and cable manufacture, as for example in the vicinity of enamel-baking towers, paper cable drying ovens and impregnating tanks, rubber and plastic extrusion machines, lead presses, and many other normal phases of wire and cable manufacture.

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The presence of oil and grease, frequently in conjunction with high room-temperature, is an operating condition to be expected in connection with the manufacture of impregnated-paper power-cable and in test-bays where it is checked. This condition is also true to some extent in the manufacture of wire rope.

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The above operating conditions,

occurring singly or in combination, but all to some extent inimical to the successful and long-life operation of the older types of plant-wiring materials and methods, justify a close look at modern and improved materials and wiring-methods, when extensions, replacements, or re-arrangements to wire and cable plants are being considered.

Older Wiring in Plant

The Canada Wire and Cable Company's Leaside operation is doubtless typical of most wire and cable plants on this continent, and for that matter, in the world. With a total floor area of 600,000 square feet, on a property measuring 25½ acres, all operations are carried out here except hot rolling of copper rod, and stranding and closing of wire rope, which latter operations involve separate plants in other cities. The plant has, since its inauguration in the year 1911, grown steadily, and in the past ten years, phenomenally. The wiring method used throughout most of this plant is what would be considered "Standard" throughout that period, and consists principally of rubber-covered wires, type "R", in rigid steel conduit and fittings. Short, flexible connections from the termination of the rigid conduit to the connection boxes of individual motors, are formed with flexible armoured cable, type BX or BXL.

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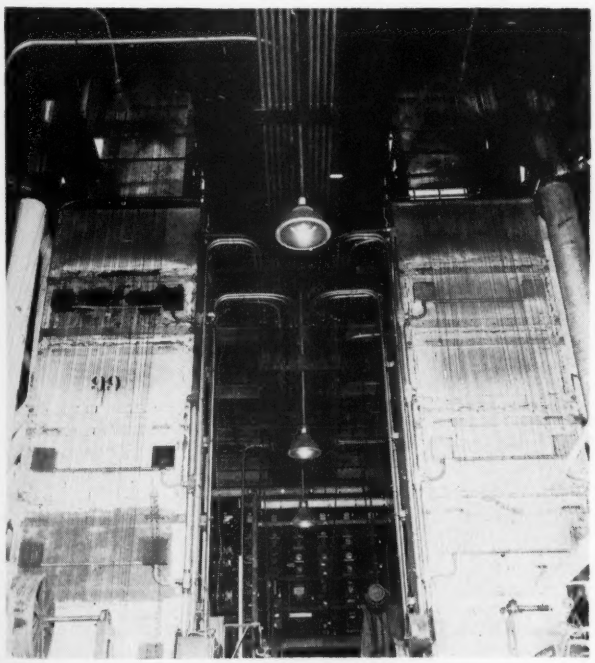
In those instances in which there is likelihood of gross mechanical damage, there is unquestionably no protection to surpass that offered by a rigid steel conduit, and in Canada, our Code-writing authorities require the use of this material in those places where heavy mechanical hazards may exist. It is perhaps equally certain that in most older plants there are great footages of steel-conduit-protected circuit run on walls and ceilings, free from any undue hazard, where the high material and labour cost of a rigid conduit system cannot be justified when other materials are available. **Fig. 1,** a view taken between units in our heavy enamelled-wire department gives an example of an extremely neat, but nowadays economically unjustifiable installation of small wiring in rigid conduit. In this instance, most of the circuits contained in these conduits consist of wires of small gauge, associated with heater controls, torque-motor drives, and similar services. Nevertheless the rigid steel conduits, unnecessary from the point of view of mechanical protection, themselves represent a considerable mass to be supported, and, especially under present day conditions, a serious item of cost both in materials and in labour. **Fig. 2** by way of contrast, indicates the manner in which similar light-weight circuits can be aerially supported if modern light-weight materials such as aluminum sheathed cables are employed. Unfortunately it was not found possible, at the time of writing, to locate two exactly corresponding applications, in which the contrast between the wiring methods could be more startlingly displayed. Nevertheless, the combination of the light-weight of the aluminum sheated cable and its relative stiffness and correspondingly small span deflections, enable approximately the same spans to be used as with rigid-conduit circuits, but very much less massive supporting members.

Load Conditions in the Plant

In the plant under consideration, load conditions apply which are probably not dissimilar to those obtaining in most wire and cable factories of the type. The connected load is in the neighbourhood of 11,000 KW, and the maximum demand about 4,000 KW. Energy consumption is at present in the vicinity of two million KW hours per month, giving a monthly load factor of approximately 73%. Of



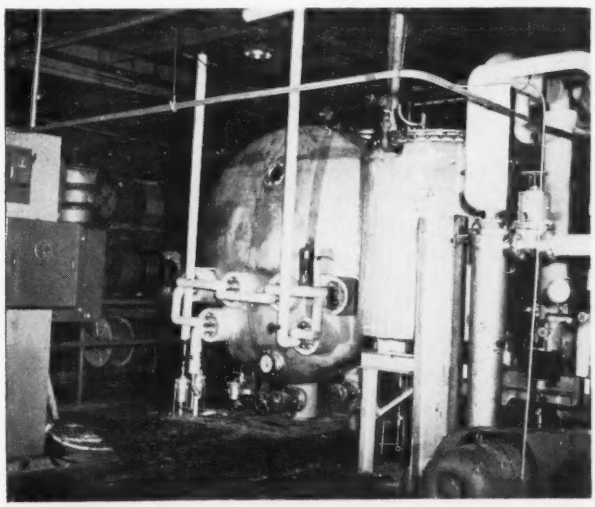


Fig. 1—(Left) View of Conduit Installation in Enamel Dept. * * *

Fig. 2—(Above) Control Circuits over Cable Oil Treating Plant. * *

the 4,000 KW of maximum demand, about one-third is non-inductive load, consisting of resistance heaters in a multitude of applications. A further 400 KW consists of direct-current load, this form of drive being employed for plastic and rubber tubers, certain wire-drawing machines and shaped-wire rolling machines, because of the fine control which it affords over speed and torque output to these machines. The direct current supply is provided by a mercury-arc rectifier with a synchronous M.G. set as a standby. The above non-inductive portion of the load exercises a beneficial effect on the overall power-factor at the point of supply. It is a characteristic of many items of wire and cable machinery that these are designed to produce a wide variety of sizes of material. Thus the motors and drives are furnished for the heaviest load expected of the machine, i.e. the largest size, highest foot-speed, hardest wire, and so forth. It follows that for a considerable portion of the time, such motors are running underloaded, with the customary results of poor power-factor and voltage regulation.

Power-Supply Arrangements

Electric current is taken from the local Utility and metered at 13,200 volts. It enters the plant by means of lead-covered underground cable, and is transformed to 550 volts for distribution in the plant. **Fig. 3** shows one of the three 2500 KvA transformers and its 13,200 volt cable entrance, and **Fig. 4** a view of the two million CM single conductor lead-covered cables leaving the transformer on the 550 volt side. Five hundred and fifty volts is the most commonly accepted voltage in Canada for plant power distribution, and corresponds to the 440 volts more usual in the United States of America. Since wire and cable for this type of service is, in any event, insulated for at least 600 volts, the smaller conductors often possible with the higher voltage, seem to us a pure gain, the only disadvantage of 550 volt as compared to 440 volt apparently being its non-susceptibility to the banking of standard 220 volt transformers.

Power Distribution in the Plant

Previously to the recent plant changes, much of the distribution had been radial from the main transformer substation, involving a multiplicity of long individual circuits at the relatively low voltage of 550 volts. If it is true, as has been said, that manufactured products may be classified according to their physical shape, then it should be true that wire and cable makers are much concerned with "long-ness" and "thinness". Certainly, many items of wire and cable machinery are long and narrow, and when placed end to end, may result, as in our case, in a very long plant and very long distribution mains with their usual susceptibility to poor voltage regulation. In conjunction with the re-arrangement of the plant, the well-known practice has been followed of establishing load-centers throughout the plant, distributing thence to individual groups of machines, and feeding each load-center by means of one or more heavy main cables. **Fig. 5** shows a view of such a load center, feeding a group of machines in the Wire Drawing Department. It will be noted that this is mounted on an overhead platform.

* * *

Much of the earlier circuiting was effected by means of cable run in shallow trenches in the floor of the plant. However this arrangement has been found to be such a nuisance during the recent

Fig. 3—2500 KvA Supply Transformer and 13,200 Volt Cable. * * *

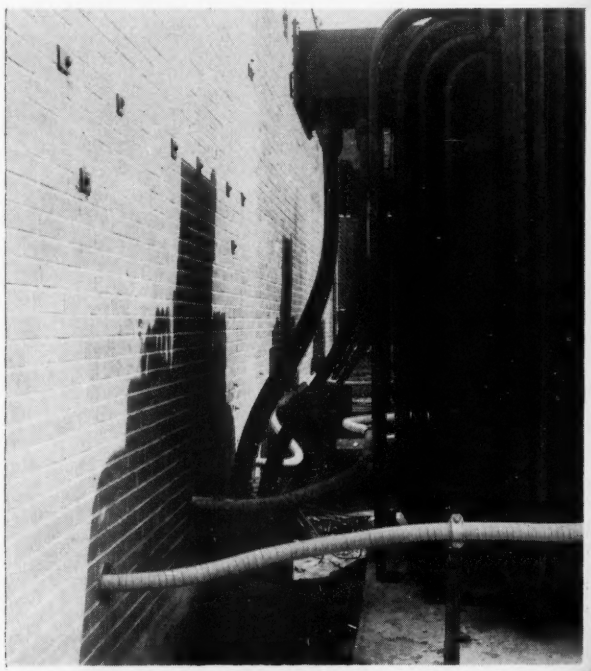


Fig. 4—13,200 Volt and 550 Volt Cable Behind Supply Transformers.

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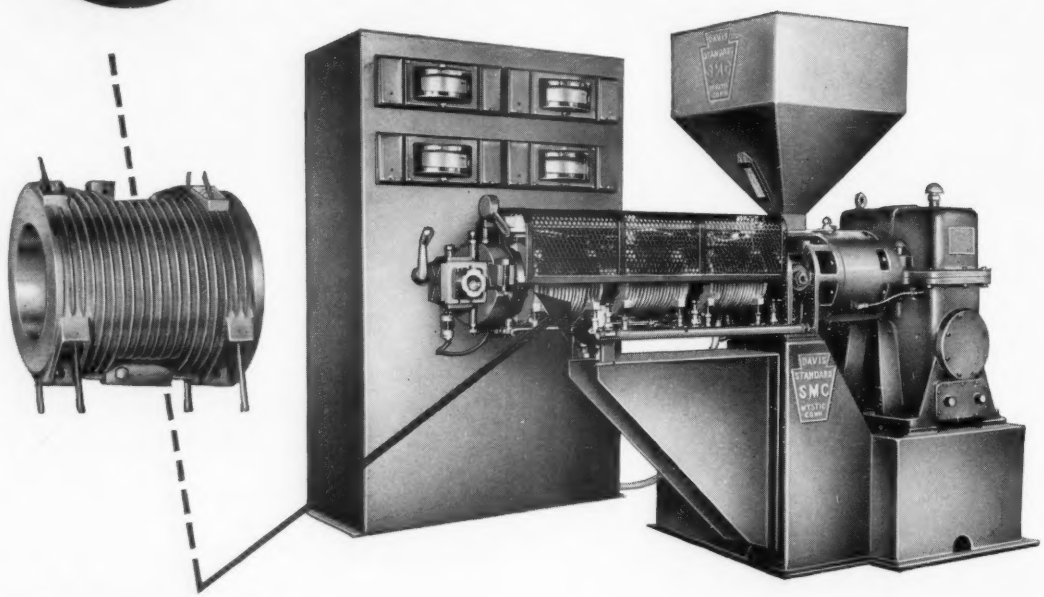

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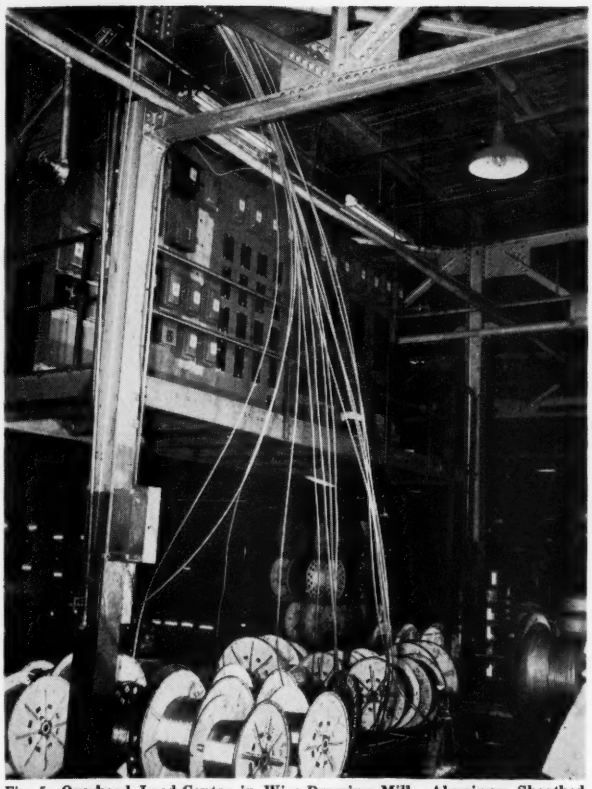

Fig. 5—Overhead Load-Center in Wire-Drawing Mill. Aluminum Sheathed Cable being Installed.

Fig. 6—Main Power Circuits under Aluminum Gallery.

programs of rehabilitation, and much of the wiring was found to be in such poor condition due to the tendency of moisture and oil to accumulate in the trenches and ultimately to deteriorate the insulation of any but a fully metal-sheathed cable, that a policy has more recently been followed, wherever feasible, of running the power-distribution circuits aerially on the beams, trusses, crane-girders and other building members. This system of aerial surface wiring is one to which aluminum sheathed cable is especially adaptable, due to its light weight and excellent appearance, and although every type of wire and cable is manufactured and available at this plant, heavy use was made of the aluminum-sheathed material as the most suitable and most economical type. However, in those instances in which it was unavoidable to run in floor trenches, lead-sheathed cable was employed, due to the somewhat smaller radius bends which can be made in the lead-sheathed cable, this being of some advantage when cables descend vertically down a building column, and pass into a relatively shallow cable trench. **Fig. 6** shows a group of main feeder cables feeding a load center in our heavy Wire Drawing Department, this particular group comprising six three-conductor 750,000 CM for A.C. supply, and two single-conductor 2,000,000 CM for D.C. supply, all paper insulated and aluminum sheathed. **Figs. 7 and** 8 show

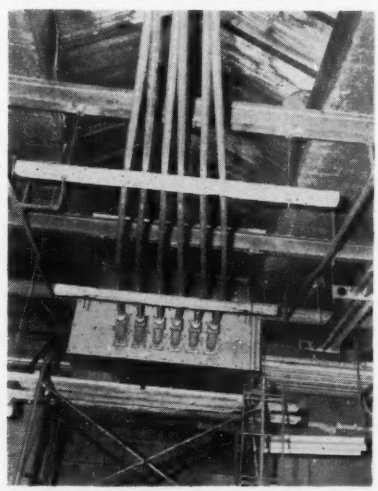

Fig. 7—Main Power Circuits at Point of Connection to Conduit Circuits.

the terminations at the two ends of these runs, and it will be noted

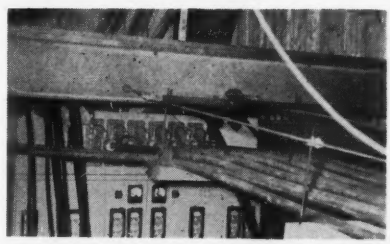

Fig. 8—Completed 1,000 Volt, 3 Con. oil impregnated Alusheath installation, showing Canada Wire Potheads.

that connection is made to the pothead-bodies by means of wiped joints, by a highly satisfactory procedure which is becoming too well known to require elaboration at this point. **Fig. 9** shows a

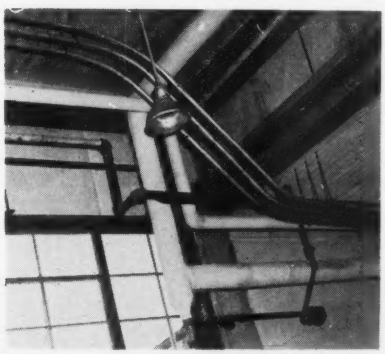

Fig. 9—Power Circuits on Ceiling of Wire-Rope Mill.

group of three somewhat smaller power circuits suspended from a mill-type ceiling and indicates graphically the light supports and relatively long spacing between supports which has been employed. **Fig. 10** shows the termination of these circuits at switch cabinets in a load-center.

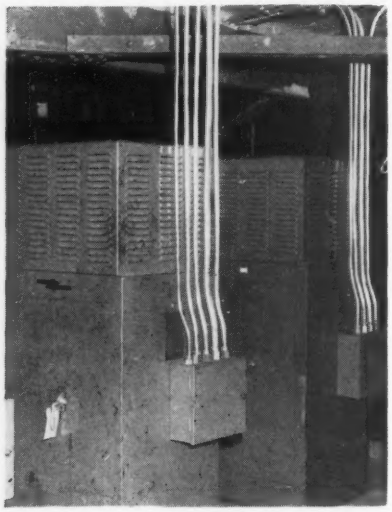

Fig. 10—Power Circuits Feeding Circuit-Breaker Cabinet. * * * * * * * * * *

Wiring Around Machines

The changes in layout of our plant have not affected the branch circuiting on the actual frames of machines to quite the same degree as they have the main distribution circuits. Generally speaking, new machinery has been received with the wiring in place, and in some instances, particularly where there exist mechanical hazards from reels, fork-trucks, and so on, the superior mechanical protection afforded by steel conduit has been retained. **Fig. 11** shows the drive end of a group of wire-rope stranders in which will be seen wiring along the bed-frame in steel conduit, but power-supply and control circuits approaching from above in aluminum sheathed cable supported on a flat structural member. **Fig. 12,** by contrast, shows an installation in which aluminum sheathed cable has been used entirely in the wiring around the machine-frames, in this instance a pair of vacuum-pumps in our paper-cable impregnating-room. The vibration characteristics of these vacuum-pumps led to the choice of this material for the sake of its inherent springiness and vibration-resistant qualities.

Small Control Wiring and Lighting Circuits

In our plant-rearrangement, in every instance in which replacements or new circuits were required in the lighting and control circuits, considerable advantage was taken of the favourable economics of the aluminum sheathed material. **Fig. 13** shows a remote control station in the Enamel Department, and **Figs. 14 and 15** the control circuits at the front of the automatic furnaces in our Wire Rope Mill. In this latter instance, it is evident that here we have a case in which high temperature insulation might well be indicated, though in this particular instance, the furnace-fronts remain unusually cool in operation, and type RH rubber insulation is used beneath the aluminum sheath. However, it is inherent in aluminum sheathed cable manufactured by the cold-sinking process, that any type of insulation may be so covered, and high-temperature makeups of asbestos, A.V.C., and silicone glass with aluminum sheath, are readily available. It is correct to point out, further, that for the extremes of ambient temperature met with in the unusual case of furnace-wiring, mineral-insulated copper-clad cable offers an alternative solution, and, with some special attention to the terminations, involves a very similar installation technique. **Fig. 16** shows a method of supporting aluminum sheathed cable lighting circuits in a wing of our buildings housing our glass-insulating machinery. Since this particular wing is a high-bay one-story structure with glass monitors, the extremely light suspension possible with the new type of wiring material was very advantageous.

Test Laboratory

Quite apart from the circumstance which led to the radical revisions in our plant layout already referred to, the securing by my Company of a number of orders for extra high tension power cables, up to and including 300,000 volts, necessitated radical revisions to our H.T. Laboratory facilities, including increased provision for design-proving at voltages up to 700 KV, especially in respect to

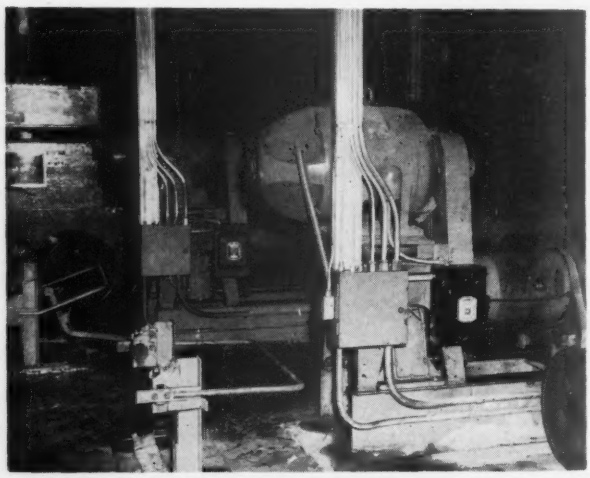

Fig. 11—Power and Control Circuits to Wire-Rope Stranders. * * *

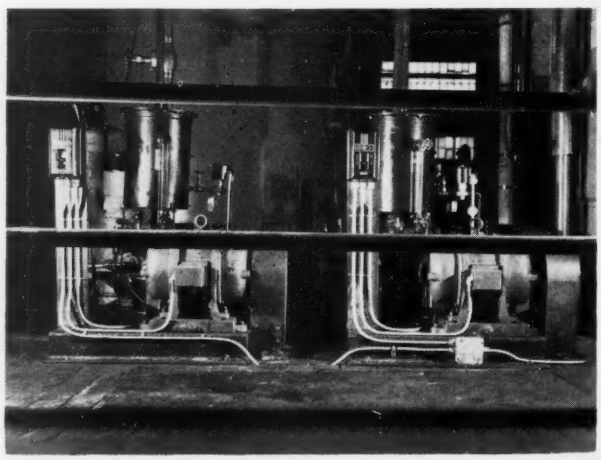

Fig. 12—Wiring to Vacuum Pumps in Paper Cable Dept. * * * *

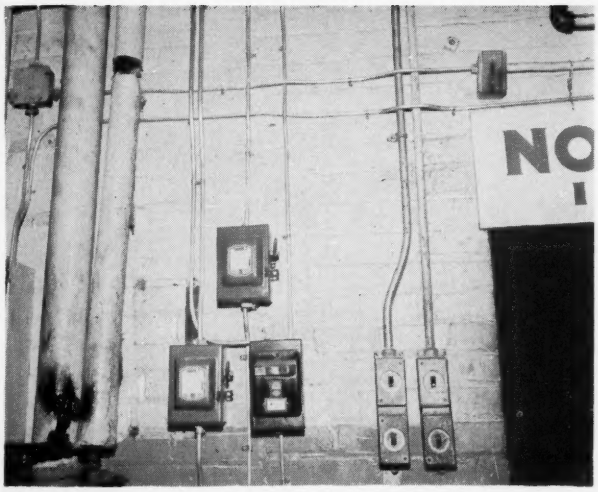

Fig. 13—Use of Aluminum Sheathed Cable at Control Stations. * * *

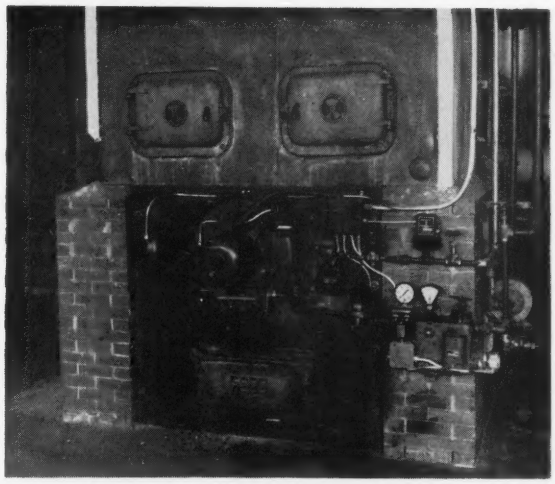

Fig. 14—Control Circuits to Heating-Furnace Front. * * * *

joints and terminations. An ideal arrangement would have been a completely separate research laboratory with separate testing transformers, but limitations of both time and space made this impossible, and arrangements had to be made for using the same set of H.T. testing transformers both for routine production testing at a very wide variety of voltages, and also for design proof-testing up to 700,000 volts, the limit of the transformers. This was solved by designing and constructing a new H.T. laboratory adjacent to the existing test floor, grouping the test transformers, switchgear and regulating equipment together in the new laboratory, and connecting through to the production-testing bay by means of a length of 120,000 volt oil-filled cable. **Fig. 17** shows the connection of this cable at the laboratory end, and **Fig. 18** its emergence at the test bay. The above arrangement, combined with the fact that the transformer equipment consists of four units, to be connected in series, parallel, series-parallel or cascade necessitated a somewhat elaborate arrangement of selector switching on the primary side of the transformers. This was accomplished by means of open switches and bus bars, as shown in **Fig. 19.** The bus material itself consists of #4/0 solid copper bar, insulated with an extruded wall .250″ thick of bright-red polyethylene. This provides

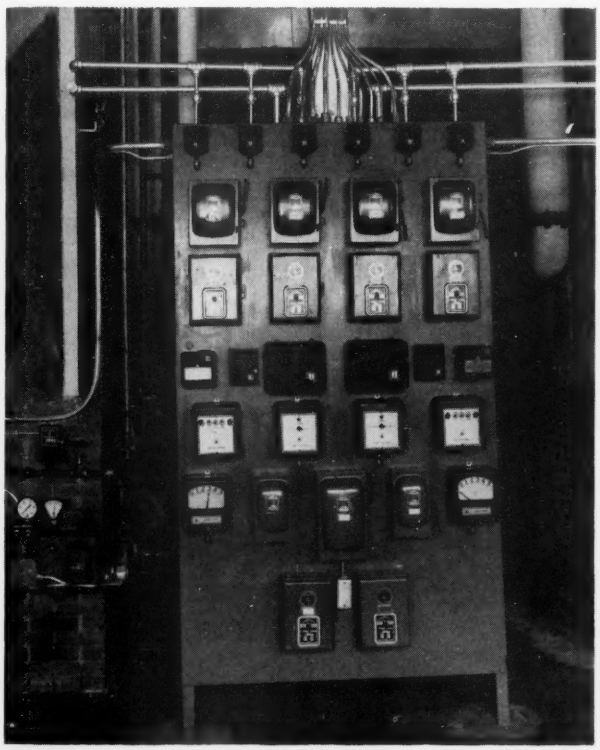

Fig. 15—Furnace Control Panel and Circuits. * * * * * * * *

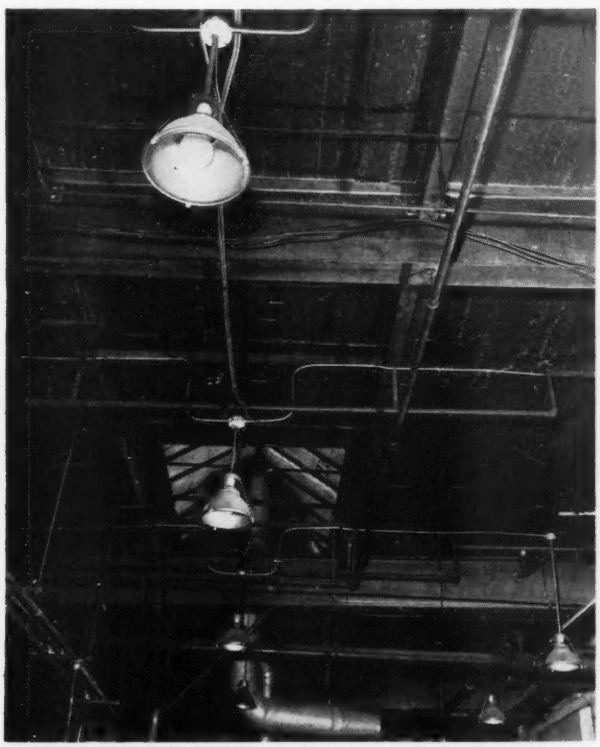

Fig. 16—Lighting Distribution Circuits on Ceiling. * * * * * *

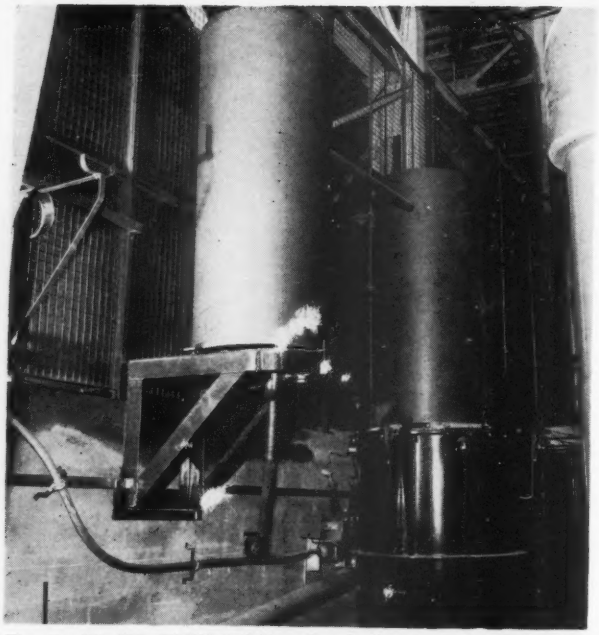

Fig. 17—120 KV Oil-Filled Cable. Termination in H. T. Laboratory.

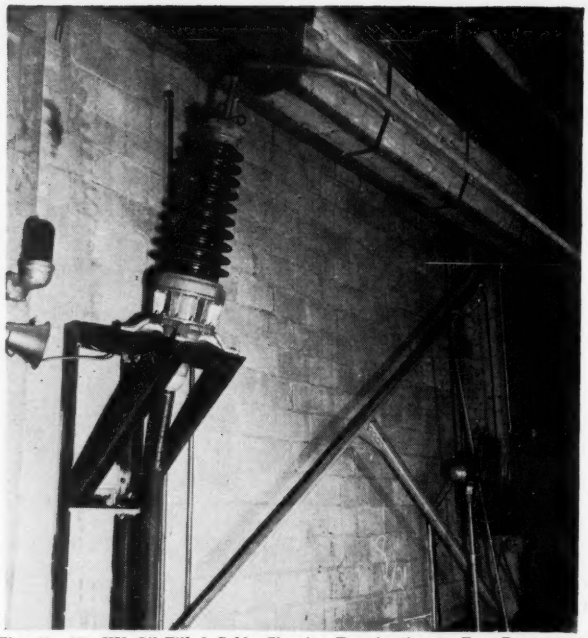

Fig. 18—120 KV Oil-Filled Cable Circuit. Termination in Test Bay. * *

an adequate safeguard against accidental contact at a very greatly reduced cost as compared to hand-taping, while the bright-red colouring in itself provides a warning to those working within the danger area. The control wiring to the test laboratory equipment, safety-gate locks, fence lights, and the control and instrument circuits to the test-switchboards, are of P.V.C. insulated aluminum sheathed control cable, as seen in **Fig. 20** taken during erection of the new laboratory.

Conclusion

This brief account of the methods used in re-circuiting an old plant and circuiting its additions, will undoubtedly seem to my hearers a tour-de-force of aluminum sheathed cable, a circumstance for which I hope it is not necessary for me to apologize. As my Company was the first to intro-

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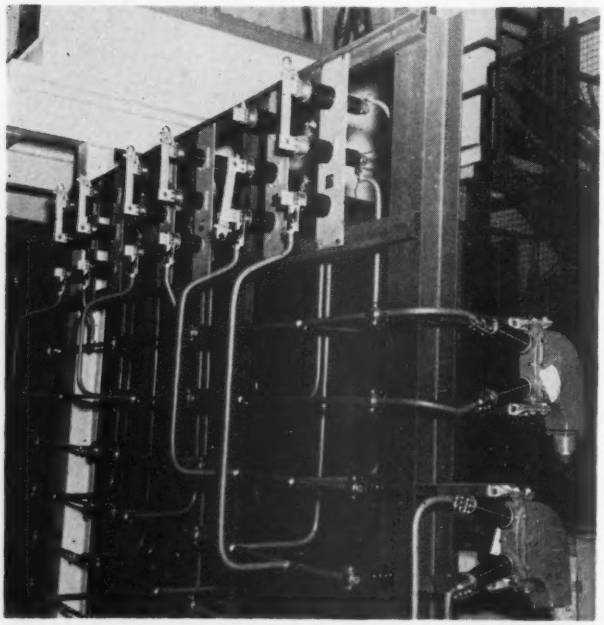

Fig. 19—(Above) 13.2 KV Selector Rack in Test Lab., Showing Polyethylene-Insulated Bus. * * * * * * * * * * * * *

Fig. 20—(Right) Installation of Control Circuits in Test Lab. * * *

Thickness Measurement and Control in the Manufacture of Polyethylene Cable Sheath

by Walter T. Eppler
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This paper was delivered at the Signal Corps Wire and Cable Symposium in Asbury Park, N. J., on December 4, 1953. It is reproduced here by permission of the Western Electric Company.

History

Six years ago, Western Electric Company started large scale manufacture of multiple sheathed cables. Lead as a sheath had been superior for forty years. The curtailment of the lead supply during Word War II and an increase in price stimulated a research that was being carried on by Western to provide a cable sheath that would be better and cheaper than lead. In 1947 a sheath consisting of an inner jacket of corrugated aluminum and an outer jacket of extruded polyethylene which is named "Alpeth" was started in regular production. Later this design was changed to a sheath known as "Stalpeth". This design shown in Fig. 1 consists of

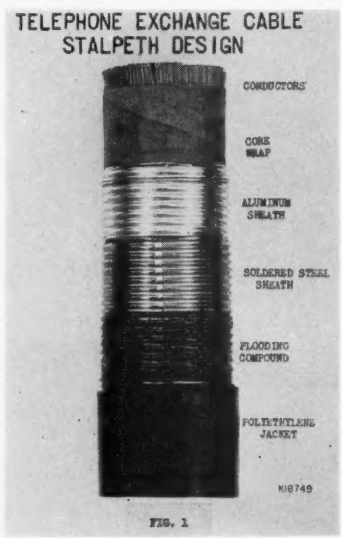


FIG. 1

a wrapping of corrugated aluminum, a second layer of corrugated terne plated steel with the overlapped seams soldered and an outer jacket of extruded polyethylene. Between the steel and polyethylene is a flooding of a rubber asphaltic compound.

* * *

Control and Inspection Problem

One of the problems in cable sheath manufacture is the measurement and control of the thickness and concentricity of the extruded polyethylene sheath. For high quality and low cost this tube must be of uniform thickness throughout its entire length.

Concentric set-up of the extrusion dies around the cable core will not produce concentric extruded sheath. This is caused by an unbalance in the plastic flow pattern in the T head of the extrusion machine, just before it enters the tubing dies. Figure 2 shows a typical extrusion core tube and die.

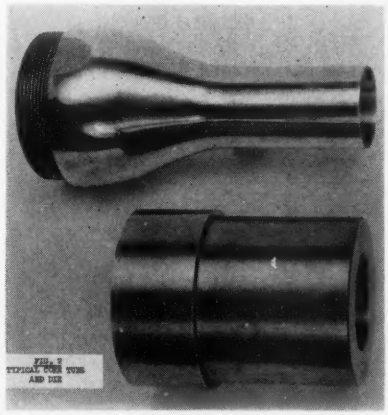


FIG. 2
TYPICAL CORE TUBE AND DIE

The core tube through which the cable core emerges is fixed in position in the extruder head. The die is located around this core tube and can be moved in any direction eccentric to the core tube. The die must be located at some one eccentric position in relation to the core tube to compensate for the differences in flow resistance of the 90° turn in the head and for the passage of the flow around the core tube and its holder. The flow resistance also varies with changes in the temperature of the plastic and of the extruder screw speed. Figure 3 shows a core tube and die mounted in the extruder head and the four die adjusting screws.

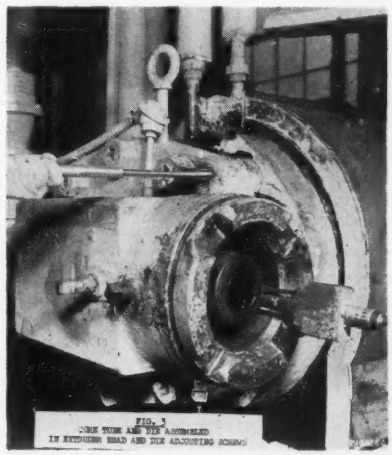


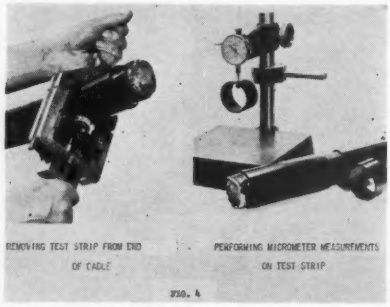
FIG. 3
CORE TUBE AND DIE ASSEMBLED IN EXTRUDER HEAD AND DIE ADJUSTING SCREWS

Movement of the die in relation to the fixed core tube is accomplished by these screws.

* * *

To set the die for concentric sheath and to adjust for specified thickness the prevailing practice of the cable art of measuring the wall thickness of a sample taken from the lead or finish ends of the sheated cable was of necessity resorted to because it was the

best technique available. Figure 4 shows the cutting of a ring of sheath and the micrometer gage.



These end samples only approximate average sheath conditions because they are but one short piece to represent cables of lengths up to a few thousands of feet.

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The extrusion art had been unable to obtain a high degree of control, primarily because sufficiently accurate measurements of the thickness could not be obtained. The sheathing machinery can be adjusted to vary the sheath eccentricity and/or the average thickness without stopping or otherwise altering the flow of polyethylene. Eccentricity was difficult to maintain within 50% of specified nominal thickness and on a new setup would occasionally be as much as 70%. Average thickness was difficult to maintain within limits of ±.010 of an inch. This condition necessitated the use of an excess of polyethylene because eccentric sheath must have a greater average thickness than concentric sheath when the same thickness of the thin side is to be maintained.

Test Set Development

The need for a better gaging method than end sampling led to an investigation of determining the wall thickness in terms of the capacitance that would be formed by the metal undersheath and an electrode sliding on the sheath surface.

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A test set shown in Figure 5 was developed which responds to changes in capacitance. The capacitance response is in turn calibrated into thousandths of an inch of sheath thickness.

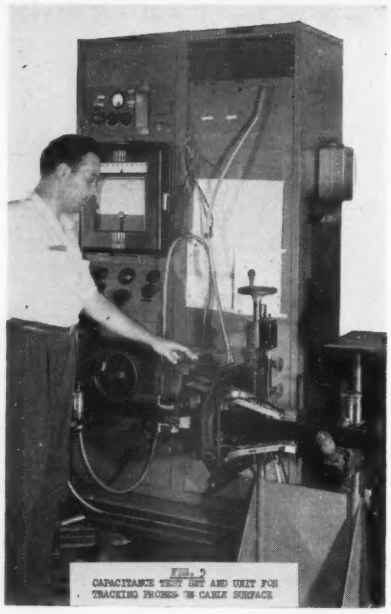
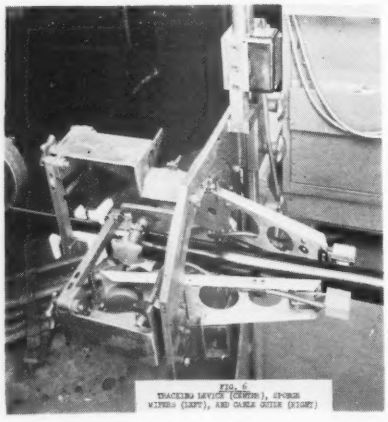


Figure 6 shows the mechanical device that holds two sensing probes on the sheath surface. The



probes are located on the free ends of the arms. They are of toroidal shape. This shape effectively compensates for variation in the capacitive relationship of probe to sheath that would otherwise result from the slight weave of cable moving at speeds up to 90 feet per minute under a stationary probe. Either eccentricity or thickness measurements can be obtained by the test set.

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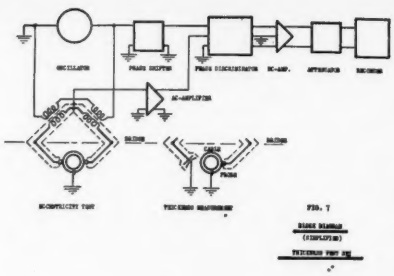
Figure 7 shows a simplified block diagram of the essential components. The heart of the system is an A.C. impedance bridge, using magnetically coupled ratio-



arms. For eccentricity measurements diametrically opposite sides of the cable sheath and probes form the other bridge arms as shown by the diagram. For thickness measurements, one arm consists of cable and probe but the forth arm is a standard capacitance as shown in the alternate arrangement. For eccentricity, the capacitance of one side of the sheath is balanced against the opposite side, any difference is indicated as an unbalance signal. For thickness, the capacitance, under the one probe on the sheath is compared to a reference capacitance, the difference being indicated and calibrated into thickness. An A.C. signal from the oscillator supplies the bridge and is also fed as a reference voltage through a phase shifter into a discriminator.

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The bridge unbalance signal, after amplification, is also fed into the discriminator where it is superimposed on the reference signal. The reference signal is in phase with the capacitive component of the bridge signal. The sum of the two signals is applied to the grid of one rectifier tube and the difference is applied to the grid of another. The resultant D.C. unbalance signal, after amplification, actuates a zero center indicator, in this case a recorder. The conductance component is balanced out by the phase discriminator, so the recorder responds only to capacitance unbalance. The electronic system is not as straight forward as this basic block diagram might indicate. It required development of advance circuitry beyond the prevailing art because the amount of capacitance being detected is so minute.

Application of Test Set to Extrusion Control

Eccentricity indications are adequate for concentricity control but give no measure of the thickness. For automatic adjustment of the die, eccentricity indications would be preferable. This development has not been pursued and is not essential because thickness measurements supply the necessary information from which manual adjustment of the die can be made to meet specified thickness and concentricity within close limits. The test set is placed at some distance after the extruder to prevent the probe from marking the plastic polyethylene.

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Figure 8 is a diagram of the machinery of the sheathing line.

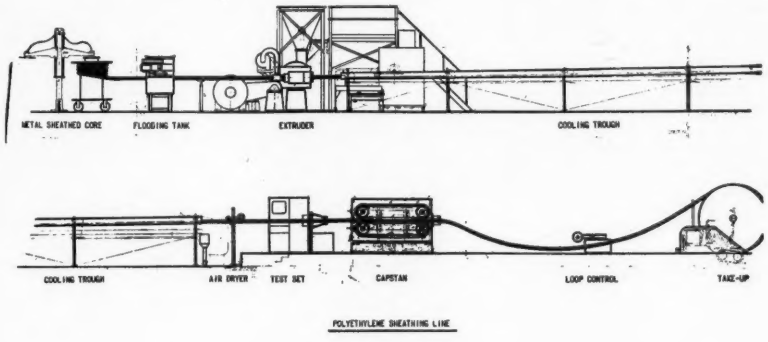

FIG. 8

The metal jacketed cable feeds from the reel at the left passing through the flooding tank where a hot rubber asphaltic compound is flowed over the corrugated metal sheath. It then progresses through the die head of the extruder where the polyethylene sheath is extruded over the flooded metal sheath. The cable with plastic polyethylene then enters the cooling trough where it is cooled and solidified. At the exit of the cooling trough is an air blower for drying the water from the sheath surface. The test set is located after the dryer. The next unit is the capstan that pulls the cable from the supply reel. The final unit to the right is the take up on the shipping reel.

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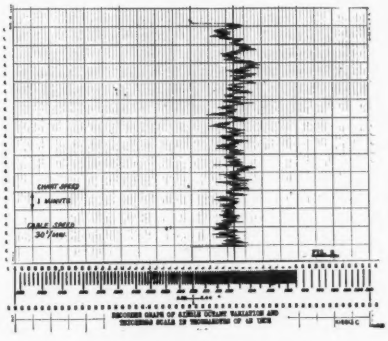
With apparently stable conditions of extrusion the spot thickness indications on the recorder will vary as much as plus or minus ten thousandths of an inch along any one line on the sheath surface while the lengthwise average remains stable. Figure 9 is a graph of typical conditions and resultant thickness fluctuations. This fluctuation includes sheath thickness variations which result from the complex interaction of the many sheathing line variables and also, the indications are somewhat increased or decreased by response to uneven flooding distribution and /or variations in surface curvature. However it is practical with one tracking probe to take thickness measurements by quadrants, or preferable octant locations around the circumference, by holding the sensing probe on the moving sheath surface consecutively at each octant location and recording thickness measurements along a short length from which that octant graph can be averaged visually within ±.001 of an inch.



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Four thickness readings to determine the direction and amount of die movement are obtained at locations on the sheath which correspond to the locations of the four die adjusting screws. Opposite quadrant thicknesses give the amount of eccentricity for each plane. The die is moved in the direction of the lower of the readings by loosening the die adjusting screw associated with the low reading and tightening the opposite screw. Adjustments can be made accurately because the amount of eccentricity is known from the thickness measurements and the amount of die movement is governed by the adjusting screw pitch.

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Adjustment to specified average sheath thickness is made from the average of the sheath wall thickness measurements at eight positions equally spaced around the circumference of the sheath. If the average is too high the speed of the cable core in relation to the speed of the sheath extrusion is increased thereby increasing the stretch or pull down of the polyethylene tubing as it is applied to the cable core. Similarly decreasing the core speed increases the average thickness.

Calibration for Thickness Measurements

Calibration of capacitance into thickness presented a difficult problem because the capacitance between the probe and the metal sheath is not a simple function of polyethylene thickness. It depends on the curvature of the sheath surface, the size and shape of the probe, the amount of flooding compound and the height and shape of the corrugated metal surface that forms the grounded plate. For a given probe, however, the capacitance depends chiefly on two conditions—the flooding and the metal sheath curvature:

1. **The flooding varies from a small amount at the bottom of the metal corrugations to an excess such that a layer of it is formed that separates the polyethylene sheath from the crests of the metal corrugations. These conditions occur even though the flooded cable is wiped before the polyethylene is applied.**
2. **The curvature of the polyethylene surface is not uniform because the extruded polyethylene tube conforms to the metal sheath. The metal sheath is out-of-round because the soldering of the metal overlap generally produces a flattened sector and the capstan at the soldering operation results in an elliptical shape.**

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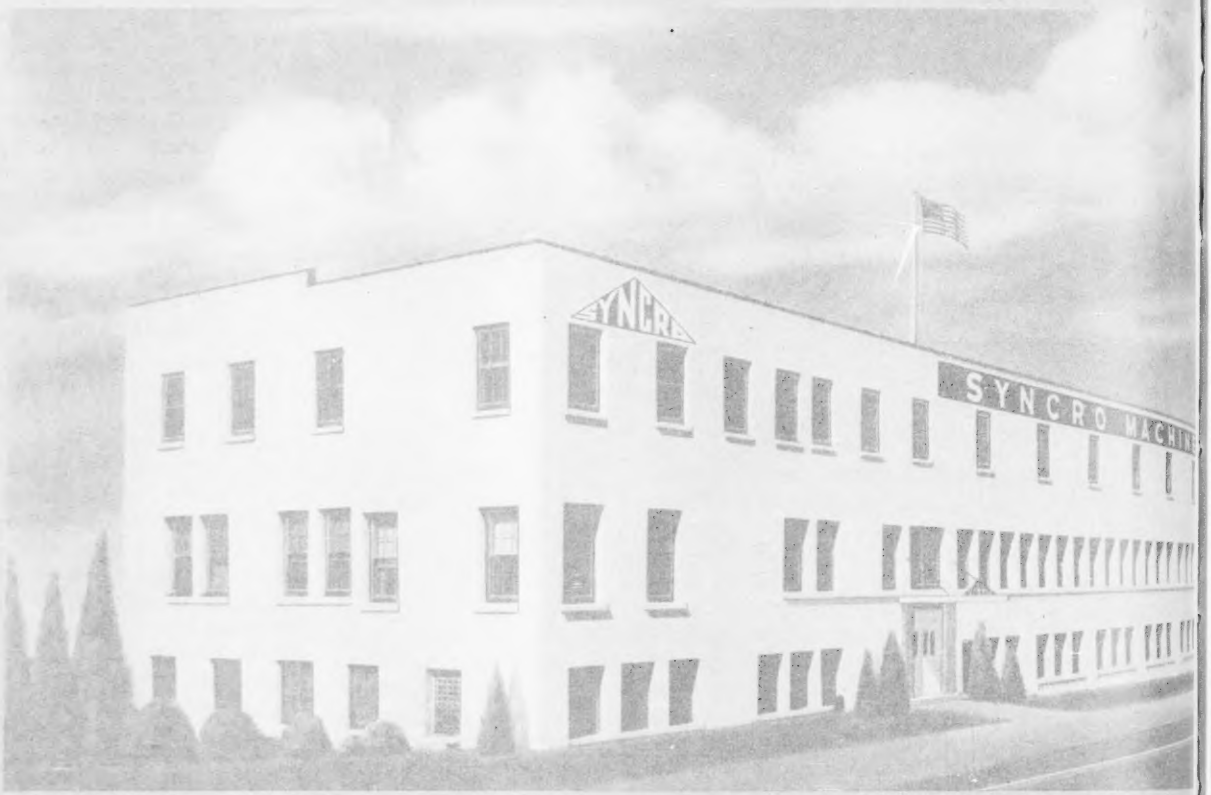

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Also, the metal jacket tends to conform to the shape of the cable core which consists of a grouping of several circular units.

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Changes in the surface curvature and in the amount of flooding can be compensating or cumulative in varying the capacitance.

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To determine whether a correlation between jacket thickness and capacitance existed extensive spot checks for three sizes of cable were made. The data was obtained by recording the capacitance readings at carefully marked points on short stationary cable samples, stripping and cleaning the test sections and measuring their thickness with a micrometer. There can be a slight error in these measurements because the micrometer measurement is only one spot in the center of an area which is effective to capacitance response. Figure 10 shows this condition. Also, it is difficult to accurately determine the surface curvature associated with the capacitance measurement:

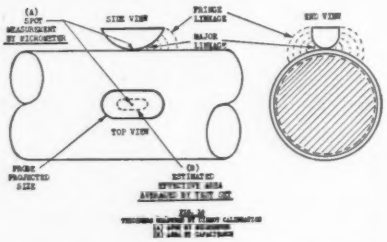
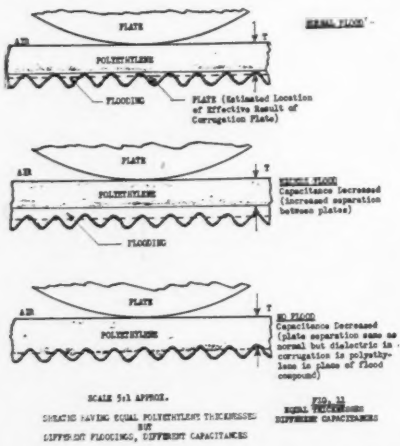


Figure 11 shows the relation of polyethylene sheath thickness to capacitance conditions as found in the samples measured. The top



sketch shows a moderate filling of the metal corrugations by the flood compound. The center sketch shows an excess of flooding and at the bottom is the condition of insufficient flood.

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The thickness is specified as the distance between the outside surface of the sheath to the bottom of the corrugations formed into the polyethylene by the crests of the corrugated metal sheath as indicated by dimension T in the sketches.

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Therefore, for conditions of equal sheath thickness as shown in the three sketches the capacitance will be different in each case. With excess flood (center sketch) the distance between plates is increased over that of the normal amount of flood (top sketch). The capacitance is decreased. Insufficient flood (bottom sketch) alters the dielectric between plates from polyethylene plus some flood to all polyethylene. The capacitance is also decreased.

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Figure 12 is a typical plot of points and the resulting calibration curve. The three cable sizes measured, each revealed a wide band of plot points. However, in each curve the points were more dense toward the thick side of the band. The number of points for any one thickness, from left to right in Figure 12 (decreasing capacitance) decrease in concentration the further to the right they go. The majority of extreme deviation points to the right were found to be cases of excessive flood to the extent that the Polyethylene was entirely above the crests of the corrugated metal base. Many of the points, just to the left of the extreme ones, in Figure 12, were cases where the amount of flood was insufficient. The majority of points at the left had the flood just filling the corrugation valleys such that the Polyethylene was flat on its inside sheath surface and was flush with the crest of the metal corrugations. This condition approaches maximum capacitance for the sheath thickness. The other points consist of many degrees between an excess and insufficient amount of flood material or are the result of deviation from correct surface curvature.

★ ★ ★

Figure 12 also shows that by far the greatest percentage of points for any one meter reading (capacitance value) are within a thickness range of approximately .006 of an inch, and that in moving downward from maximum thickness the concentration of measured thicknesses increases rapidly over approximately .003 of an inch and then becomes progressively less covering on additional .010 of an inch. The selected location for a calibration curve was placed at about the location of maximum point concentration. This location therefore, represents the mean jacket thickness vs. capacitance for conditions of moderate flooding and concentric corrugated metal sheathed core. By averaging the thickness indications along a short length of the cable a measurement adjusted for the occasional extremes in flooding and surface curvature variations is obtained. The accuracy for practical use is therefore within limits of +.002 and —.004 of an inch from the mean.

★ ★ ★

Investigation was also made of the calibration curve obtained from flat samples of Polyethylene placed upon a flat metal plate and of various thicknesses. Flat samples eliminate the variables introduced by the cable surface curvature, the corrugated metal undersheath and the flooding material between the Polyethlylene and the metal. Figure 13 is a plot of capacitance (meter units) against Polyethylene thickness for flat samples. Each point represents an individual molded flat sample.

★ ★ ★

When the calibration curves for the 3 cable sizes and the curve for flat samples were drawn to the same capacitance vs. thickness scale all appeared to have similar form but were displaced one from the other. The capacitance varies as a function of cable diameter for the same sheath thickness. Figure

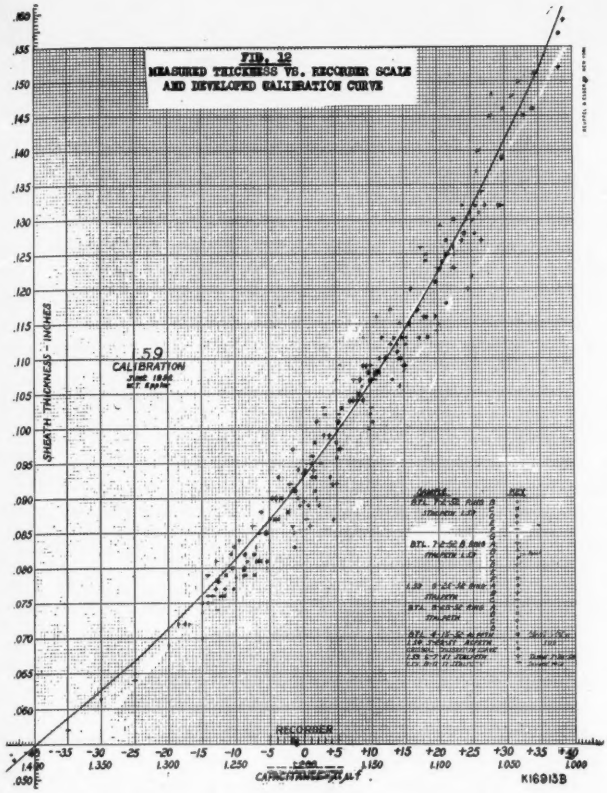


FIG. 12
MEASURED THICKNESS VS. RECORDER SCALE AND DEVELOPED CALIBRATION CURVE

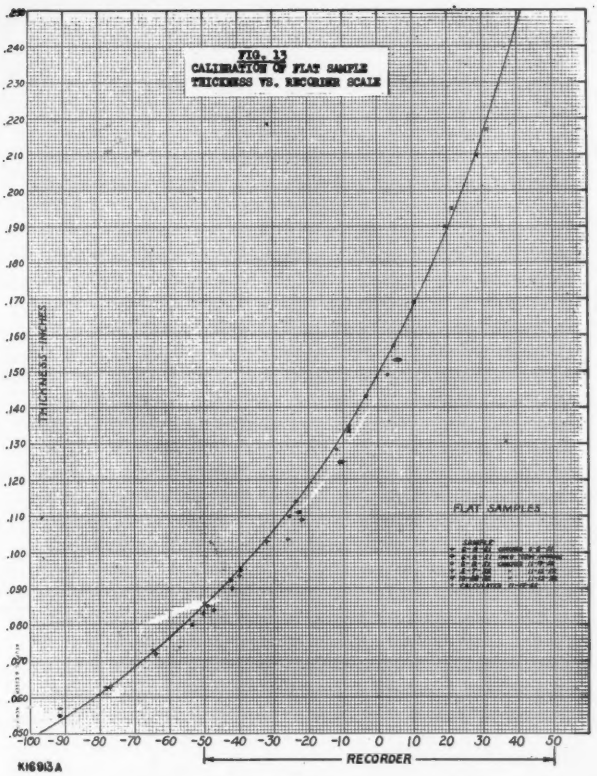


FIG. 13
CALIBRATION OF FLAT SAMPLE THICKNESS VS. RECORDER SCALE

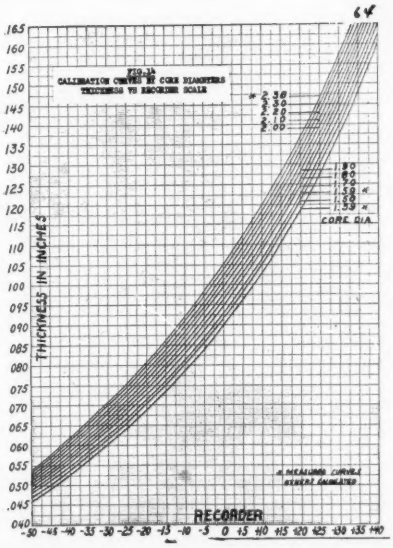
14 shows the displacement of calibration curves for cables of core diameters of 1.39 to 2.38 inches. The displacement is approximately 1 meter division for a diameter change of .1 of an inch. Therefore, it was apparent that a different calibration exists for each amount of surface curvature.

★ ★ ★

Calibration for other cable diameters than the three completely measured was obtained by measuring a few points from sheath to determine displacement and slope and then multiplying the flat sample curve valves by the displacement factor and the slope correction factor.

Inspection Procedure

The thickness test provides a precise gage for the inspection organization to measure compliance of the sheath to specified requirements. Inspection possibilities with the thickness test set are many and the problem becomes one of an economic procedure that will assure the required quality.



Continuous recording of the entire cable length is practical but is unnecessary from a manufacturing viewpoint. Recorder chart speed is one half an inch per minute and cable speeds are from 20 to 90 feet per minute. It was found that the fluctuations or variation peaks of one line along the cable length could be averaged from chart lengths of ¼". Also that by taking measurements consecutively by octants around the circumference a practical measure of the entire circumference is obtained and is sufficient coverage to locate the minimum wall thickness. The graphs of Figure 15 show typical

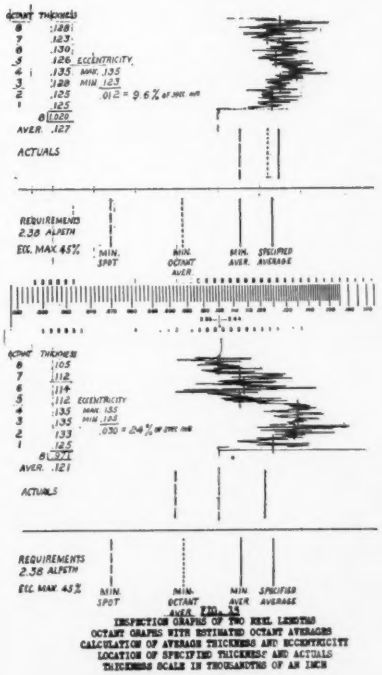


FIG. 15
INSPECTION GRAPHS OF TWO REEL LENGTHS
OCTANT GRAPHS WITH ESTIMATED OCTANT AVERAGES
CALCULATION OF AVERAGE THICKNESS AND ECCENTRICITY
LOCATION OF SPECIFIED THICKNESS AND ACTUALS
THICKNESS SCALE IN THOUSANDTHS OF AN INCH

inspection recordings of two cable

lengths.

★ ★ ★

Four thicknesses are specified for inspecting sheath all of which are obtained from a graph of the consecutively recorded octants. These checks are:

1. **The minimum spot thickness.**
2. **The average thickness lengthwise along the thinnest side. (Average of minimum octant).**
3. **The average cross sectional thickness. (Average of octant averages).**
4. **The maximum difference between the lengthwise average of the thickest side (Average of maximum octant) and the lengthwise average of the thinnest side. (Average of minimum octant).**

The location of the four major thickness limits have been indicated below the test graphs.

Conclusions

Control of the concentricity and average thickness from the former method of end sampling resulted in eccentricity of the sheath in the order of 30 to 60%. At that time the safe practice was to make the average thickness greater than specified nominal in order to keep the thin side of eccentric sheath within the minimum spot limit. This excess amounted to approximately 10%.

★ ★ ★

With the test set, concentricity within 10% is maintained under good operating practice and within 20% as a common condition. Average thickness can be controlled to within ± .003 of an inch.

★ ★ ★

This improvement in concentricity and thickness control permits operating at specified nominal thickness without varying below minimum limits and thereby eliminates the 10% excess usage of Polyethylene.

★ ★ ★

In conclusion, this test equipment has proved to be practical means to the control of the concentricity and the average thickness of the Polyethylene sheath of Alpeth and Stalpeth cables. It measures the sheath wall thickness directly in thousandths of an inch both visually and as a recorded graph and does no nondestructively as the sheath is applied. It is accurate, reliable and of construction suitable for continuous shop use. The sheath is of consistently high dimensional quality not previously obtainable. Two major advantages have been gained:

1. **Polyethylene is conserved and manufacturing costs reduced. Eleven percent thinner sheath wall thicknesses are practical with the improvement in concentricity. At capacity level, the polyethylene saving is 500,000 lbs. per year.**
2. **The quality of the sheath is improved through close dimensional control.**

WHAT MEMBERSHIP IN THE WIRE ASSOCIATION OFFERS YOU:

1. **WIRE & WIRE PRODUCTS**—For One Year. The official publication of The Wire Association, covering The Wire Industry; its Metallurgy, Technology, Research, Processes, Machinery and Personnel.
2. **THE ANNUAL BUYERS GUIDE & YEAR BOOK OF THE WIRE ASSOCIATION.** The Year Book Section contains: Constitution and By-Laws of The Wire Association; Details of year's meetings, etc.; List of Members, Index to Papers and Articles in WIRE & WIRE PRODUCTS.
3. **QUESTION AND ANSWER SERVICE.** Answers to technical and operating problems direct by mail. Available to members only.
4. **ANNUAL CONVENTION.** Technical sessions covering metallurgical and manufacturing problems involved in the production of ferrous and non-ferrous wire, electric wire and cable and other products fabricated either wholly or in part from wire. Plant inspections.
5. **REGIONAL MEETINGS.** Attendance at the regional meetings which include Local Plant Inspections, Technical Sessions and Discussions.
6. **PERSONAL CONTACTS.** Both at Annual and Regional Meetings, and throughout the year, for interchange of helpful information.
7. **INFORMATION SERVICE ON MACHINERY, EQUIPMENT AND SUPPLIES.** The Technical, Catalogue and Correspondence Files of the Wire Association hold the answer to practically every "Where can I buy" problem. This service is available to members without charge.

ANNUAL DUES: $15.00

For booklet giving detailed information and a membership application card, address

RICHARD E. BROWN, Executive Secretary

453 Main Street • **Stamford, Conn.**

On the occasion of our Silver Anniversary, the Directors and Officers of

The Wire Association

and the staff of

Wire and Wire Products

extend their cordial greetings to members, old and new, to the concerns who comprise our industry, and to its suppliers, in grateful appreciation of their many years of loyal cooperation, through whose interest and support, the work of the Association has been facilitated and made possible.

THE

WIRE ASSOCIATION

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Titles and connections of Past Presidents are those at the time each held office.

The Wire Association is a non-profit organization of wire mill executives, superintendents and foremen. It also includes plant engineers, traffic men, and all others engaged in the production of cold drawn bars, rods, wire, strip, insulated wire and cable, and the manufacture and fabrication of finished wire products, including cold headed, extruded and other cold worked metal products.

There are separate divisions for all the various major interests in the wire industry, steel, iron, brass, copper, alloy, and precious metals, together with divisions relating to drawing, cold working, cold heading, extruding, fabricating, forming, spring making, wire cloth, wire rope, bare and covered electric wire and cable and all other forms of wire and wire products.

PURPOSES

Its specific purpose is to improve production methods and afford a clearing house for ideas on management problems, technical problems, and research work in all phases of practical wire drawing and wire working, and to develop and maintain friendly relations among the members.

ACTIVITIES

The Association functions along the following lines:

1. The use of the Association headquarters as a central clearing house for information and data of all kinds which may be of interest to members.
2. The exchange of ideas on processes of production including machinery, technical processes, etc.
3. The establishment and maintenance of friendly relations among the members of the association and the development of sectional and national meetings to discuss matters of mutual interest.
4. Studies of production methods and analysis of production costs.
5. Developments in the use of new materials and new applications of existing materials and by-products.
6. Research and collection of information on personnel management, including such factors as labor turnover, seasonal changes in the demand for employees, wage scales, etc.
7. Standardization and simplification as a means for the effective elimination of waste.
8. Such other subjects as may be determined upon.

THE ANNUAL CONVENTION OF THE WIRE ASSOCIATION

STATLER HOTEL, DETROIT, MICH., NOVEMBER 8-11, 1954

The Wire Association's Headquarters at The Statler Hotel
will be open from Monday, November 8th, every evening during the Convention.
Come and get acquainted.

THERE WILL BE A REGISTRATION FEE OF $11.00 FOR MEMBERS AND $13.00 FOR NON-MEMBERS, INCLUDING AN ANNUAL LUNCHEON TICKET, FOR ALL THOSE ATTENDING THE TECHNICAL SESSIONS AND MEETINGS.
PLEASE HAVE YOUR ASSOCIATION MEMBERSHIP CARD WITH YOU AND SHOW IT WHEN REGISTERING.

ADMISSION WILL BE BY BADGE ONLY—PLEASE WEAR IT.

THE WIRE ASSOCIATION PROGRAM COMMITTEE FOR THE 1954 CONVENTION

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Scovill Manufacturing Company
Waterbury, Conn.

Glenn J. Moher, Manager of Methods
Wire and Cable Section
Canadian General Electric Co., Ltd.
Peterborough, Canada

All papers presented at the Convention by members of The Wire Association are eligible for consideration for the Annual Medal Award, and will be voted upon by the Board of Directors at the next Spring meeting of that body.

Technical papers are preprinted in the October issue of Wire and Wire Products insofar as possible. Titles to papers accepted will be given to The Wire Association and duly copyrighted at the time of publication.

All wire mill men and wire mill suppliers are invited to attend this convention, see how the Association functions and participate in the activities.

Hotel reservations should be made by members of the Wire Association direct to the Secretary.
MAKE YOUR PLANS NOW TO ATTEND AND SEND YOUR RESERVATION PROMPTLY

MONDAY, NOVEMBER 8th

9:00 A.M.
REGISTRATION

10:00 A.M.
DIRECTORS' MEETING

12:30 P.M.
PROGRAM COMMITTEE LUNCHEON

THE CONVENTION PROGRAM

STATLER HOTEL, DETROIT, MICH., NOVEMBER 8-11, 1954

MONDAY, NOVEMBER 8th

9:00 A.M. Registration Desk opens on the mezzanine floor.

10:00 A.M. Annual Meeting of the Board of Directors of the Wire Association.

12:30 P.M. Directors' Luncheon for Program Participants.

AFTERNOON SESSION—2:00 P.M.

Joint Technical Meeting for Both Ferrous and Non-Ferrous Groups.

CHAIRMAN OF MEETING

John H. Richards, Jr., Chem. Eng., Apex Alkali Products Co., Philadelphia, Pa.

Address of Welcome by Leonard C. Crewe, Jr., Pres., Maryland Fine & Specialty Wire Co., Cockeysville, Md., President of The Wire Association.

SYMPOSIUM ON WIRE DRAWING LUBRICANTS

PANEL MEMBERS

Dr. Gray Verner, Technical Director Standard Industrial Compounds Co. Chicago, Ill.	Leon Salz, Mgr. Lubricants Div. Magnus Chemical Co. Garwood, N. J.	Jerome B. Bean, Wire Lubricants Div., Apex Alkali Products Co. Philadelphia, Penna.

Panel members will discuss wet and dry drawing lubricants for ferrous and non-ferrous wires and will welcome questions and comments from the floor following their presentations.

PAPER: "Quality Control in the Wire Industry."	Control limit calculations and modified method compared with new method found successful in job-shop quality control installations.	by Axel U. Sternlof, Div. Product Eng., Electrical Cable Works American Steel & Wire Div. U. S. Steel Corp. Worcester, Mass.

TUESDAY, NOVEMBER 9th

FERROUS SECTION

MORNING SESSIONS—9:30 A.M.

CHAIRMAN OF MEETING

H. Clark Smith, Jr., Supt., Heavy Wire Div., Wilbur B. Driver Co., Newark, N. J.

PAPER: "The Effects of Coiling Temperatures of Hot Rolled Rods."	Temperature of rods at finishing has direct bearing on scale and the problem of removing it.	by Robert A. Stebbins, Asst. Supt. Rod and Wire Div. Bethlehem Steel Co. Johnstown, Pa.
PAPER: "Processing of Wire Products in Salt Bath Furnaces."	Review of annealing and cleaning operations in salt bath furnaces, with data on time cycle, power, salt and maintenance costs.	by Leon B. Rosseau, Vice Pres. Ajax Electric Company Philadelphia, Pa.
PAPER: "Continuous Patenting, Cleaning and Coating of Steel Wire."	A rope manufacturer's point of view on the processing of wire to achieve uniform quality.	by Donald K. White, Foreman #2 Wire Mill John A. Roebling's Sons Corp. Trenton, N. J.

NON-FERROUS SECTION

CHAIRMAN OF MEETING

Andrew Pudlak, Field Eng., Copperweld Steel Co., Glassport, Pa.

PAPER: "A Study of the Solvent Resistance of Formvar Enameled Wire."	Discussion of magnet wire coatings.	by Dr. J. A. Loritsch, Mgr. Alkyd Products Eng. Chemical Materials Div. General Electric Co. Schenectady, N. Y.
PAPER: "Electrotinning Copper Wire from the Stannous Fluoborate Bath."	Description of widely used process for tin coating copper wire for conductors.	by Dr. A. E. Carlson Engineering Service Laboratory General Chemical Div., Allied Chemical & Dye Corp. Edgewater, N. J.
PAPER: "Composite Wires by Electroplating."	A discussion of composite metals and the manufacture of composite wires.	by Edward G. Slick, Supervising Engineer Sylvania Electric Products Warren, Pa.

TUESDAY, NOVEMBER 9th (cont'd)

AFTERNOON SESSION—2:00 P.M.

FERROUS SECTION

CHAIRMAN OF MEETING

Frederick W. Leslie, Supt., G. F. Wright Steel & Wire Co., Worcester, Mass.

PAPER: "Prestressing Wires—Stress-Relaxation and Stress-Corrosion Up to Date."	Latest information and Importance of protection against corrosion accented.	by Gordon T. Spare, Research Project Engineer American Steel & Wire Div. United States Steel Corp. Cleveland, Ohio
PAPER: "Phosphate Coating of Steel Wire."	How phosphate coatings function and their advantages are covered in this paper.	by James S. Leland, Engineer Parker Rust Proof Company Detroit, Mich.
PAPER: "Acid Cleaning of Stainless Steel."	Fundamentals in make-up of oxidized surfaces on stainless steels and various cleaning practices used in the industry.	by John H. Corson, Director of the Laboratory Carpenter Steel Co. Reading, Pa.

NON-FERROUS SECTION

CHAIRMAN OF MEETING

Glenn J. Moher, Mgr. of Methods, Wire & Cable Section, Canadian General Electric Co., Peterborough, Can.

PAPER: "Rigid and Semi-Rigid PVC Insulations."	Properties of these materials and their applications to electric conductors, based on recent laboratory developments.	by J. L. Foster, Product Engineer Plastic Materials B. F. Goodrich Chemical Co. Cleveland, O.
PAPER: "Some Controversial Points on Dry Blending"	Dry blending is more than formulating ingredients. Matters to be considered and critical problems of blending are discussed.	by Milton S. Greenhalgh, Superv., Thermoplastic Insulation Unit, CM Laboratory General Electric Co. Bridgeport, Conn.
MOTION PICTURE: "Cable—Pathway to Power"	A fine new motion picture depicting cable manufacture and applications.	Shown through the courtesy of the Rome Cable Corporation, Rome, N. Y.

WEDNESDAY, NOVEMBER 10th

MORNING SESSIONS—9:30 A.M.

FERROUS SECTION

CHAIRMAN OF MEETING

Glenn R. Lee, Wire Mill Supt., Continental Steel Corp., Kokomo, Ind.

PAPER: "Cooling of Steel Wire in Continuous Drawing."	Report on investigation of effect of air volume and finishing speed on wire temperature rise and physical property.	by Norman A. Wilson, Asst. Director of Research Morgan Construction Company Worcester, Mass.
PAPER: "Continuous Wire Drawing and Packaging."	This new process has expanded beyond original concepts. Principles explained and new fields of application outlined.	by Wm. H. Richardson, Vice Pres. The Driscoll Wire Co. Shelton, Conn.
PAPER: "Making Shaped Dies by the Electrical Discharge Process."	The process will be described and samples of dies made by this and conventional methods will be on hand for inspection.	by H. V. Harding, Tech. Asst. to Pres. Elox Corp. of Michigan Detroit, Mich.

NON-FERROUS SECTION

CHAIRMAN OF MEETING

Grayson B. Wood, Jr., Mill Prod. Eng., Scovill Manufacturing Co., Waterbury, Conn.

PAPER: "The Application of Wire and Cable to a Wire and Cable Plant."	Deals with the peculiarities of wire and cable power loads, drives, etc., as they affect the choice of wire and cable feeding the various types of mill machinery.	by Phillip J. Croft, Chief Engineer Canada Wire & Cable Co., Ltd. Toronto, Can.
MOTION PICTURE	A sound-color picture depicting: "Copper, Mined to Finished Products."	Shown through the courtesy of the Canada Wire & Cable Co., Ltd. Toronto, Can.

WEDNESDAY, NOVEMBER 10th (cont'd)

AT 1:00 P.M. — THE ANNUAL WIRE ASSOCIATION LUNCHEON

LADIES WELCOME

The Mordica Memorial Lecture
by Carl E. Johnson, Supt., Rod & Wire Mills, Bethlehem Steel Co., Sparrows Point, Md.

LADIES WELCOME

THE PRESENTATION OF AWARDS FOR 1953

MEDAL AWARD: To Vito J. Vitelli, Process Engineer, Metallurgical Engineering Dept., Steel Wire Mills Div., John A. Roebling's Sons Corp., Trenton, N. J., for the most meritorious paper—"The Drawing of Shaped Steel Wire."

CERTIFICATE OF HONORABLE MENTION: To Dr. F. R. Morral, Head, X-Ray Dept., Div. of Metallurgical Research, Kaiser Aluminum and Chemical Corp., Spokane, Wash., and Dr. F. A. Schaufelberger, Chemical Construction Corp., New York, N. Y., for the best ferrous paper—"Molten Salts for The Wire Industry."

CERTIFICATE OF HONORABLE MENTION: To F. W. Wurtzell, W. J. Canavan and B. H. Maddock, Development Engineers, Bakelite Company, New York, N. Y., for the best non-ferrous paper—"A Review of Fluorothene in the Wire and Cable Industry."

AT 4:00 P.M.—THE ANNUAL MEETING OF THE WIRE ASSOCIATION

This is the annual business meeting of members of the Association. Your personal attendance is needed and urged.

Chairman of Meeting
Leonard C. Crewe, Jr., President,
The Wire Association

IN THE EVENING

THE ANNUAL STAG SMOKER—DINNER

6:30 P.M.—Cocktail Bar Opens

7:30 P.M.—Dinner and Show

CHAIRMAN, ENTERTAINMENT COMMITTEE: Eber J. Hubbard, Jr.

COME ONE, COME ALL—AND HAVE A GOOD TIME!

THURSDAY, NOVEMBER 11th

The day is devoted entirely to plant inspection tours, of which there are two, as follows:

THESE TOURS WILL BE TAKEN JOINTLY BY BOTH THE FERROUS AND NON-FERROUS GROUPS.

In the morning busses will leave the Hotel at 9:00 A.M. for a tour of the plant of the Carboloy Dept., General Electric Company, Detroit.

At noontime, luncheon will be served with the compliments and through the courtesy of the Carboloy Department.

In the afternoon, busses will leave the Carboloy plant for a tour of the plant of the Ford Motor Company in Dearborn, Michigan.

FOR THESE TOURS, ALL PERSONS MUST GO BY BUS. NO PRIVATE CARS MAY BE USED. TO BE ADMITTED, ALL VISITORS MUST WEAR THEIR BADGES; NO EXCEPTIONS, PLEASE: THESE MEASURES ARE FOR SECURITY AND SAFETY.

These plant inspection trips conclude the 1954 Convention.

RESEARCH PAPERS ARE PREPRINTED IN THE OCTOBER ISSUE OF WIRE AND WIRE PRODUCTS.

The Discussions and the Mordica Memorial Lecture will be printed in the January issue of Wire and Wire Products.

Papers not received in time for preprinting will be published in the November and December issues of Wire and Wire Products.

THE WIRE ASSOCIATION ANNUAL MEDAL AWARDS

All members of the Wire Association are cordially invited to submit technical papers either for publication in "WIRE & WIRE PRODUCTS" during the year or for presentation before the Annual Wire Association or the Regional Meetings.

Each year a medal will be awarded the paper selected as being the most meritorious one on wire manufacture or fabrication.

Honorable Mention Certificates are also awarded in each division.

All papers submitted become the property of the Wire Association, and the Board of Directors constitutes the Committee on Awards.

Consideration for the Medal Award is not limited to the papers presented at the Meetings, but is given to all papers contributed by members and published in "WIRE & WIRE PRODUCTS" during the year.

MEDAL AWARDS—1934-1953

1934 — EDWARD J. P. FISHER

Metallurgist, Keystone Steel & Wire Co., Peoria, Ill.

Title of Paper: "COLD DRAWN STEEL SPRING WIRE"

1935 — BENJAMIN LEWIS McCARTHY

Metallurgist, Wickwire Spencer Steel, Buffalo, N. Y.

Title of Paper: "GRAIN SIZE AND ITS INFLUENCE ON THE MANUFACTURE OF STEEL WIRE"

1936 — ROBERT NOTVEST

Chief Engineer, Welding Division, J. D. Adams Mfg. Co., Indianapolis, Ind.

Title of Paper: "STEEL FOR ARC WELDING ELECTRODES"

1937 — BENJAMIN LEWIS McCARTHY

Chief Metallurgist, Wickwire Spencer Steel, Buffalo, N. Y.

Title of Paper: "ABNORMAL GRAIN GROWTH AND THE ANNEALING OF LOW CARBON STEEL WIRE"

1938 — WALTER R. BLOXDORF

Metallurgist, The MacWhyte Co., Kenosha, Wis.

Title of Paper: "WIRE ROPE"

1939 — STANLEY P. WATKINS

Manager, Sales Development, Rustless Iron and Steel Corp., Baltimore, Md.

Title of Paper: "THE MANUFACTURE AND USE OF STAINLESS STEEL WIRE"

1940 — ROBERT W. SANDELIN

Metallurgist, Atlantic Steel Company, Atlanta, Georgia

Title of Paper: "GALVANIZING CHARACTERISTICS OF DIFFERENT TYPES OF STEEL"

1941 — CARLETON W. GARRETT

Wire Mill Metallurgist, Aliquippa Works; Jones & Laughlin Steel Corp., Aliquippa, Pa.

Title of Paper: "A BRIEF DISCUSSION ON THE MANUFACTURE OF STEEL FOR ARC WELDING ELECTRODES"

1942 — LEROY DEVOE SEYMOUR

Asst. Works Manager, Canada Works, Steel Company of Canada, Ltd., Hamilton, Ont., Canada

Title of Paper: "SCHEDULING AND PLANNING THE WIRE MILL FOR WAR PRODUCTION"

1943 — JOHN C. AIKEN

Asst. Supt., Rod and Wire Mills, Jones & Laughlin Steel Corp., Aliquippa, Pa.

Title of Paper: "DRAWING HIGH SPEED ROPE WIRE"

1944 — AUGUST R. ZAPP

Manager, Carbides Division, Firth-Sterling Steel Company, McKeesport, Pa.

Title of Paper: "HISTORY AND GROWTH OF THE TUNGSTEN CARBIDE DIE"

1945 — MATTHEW J. DONACHIE

Consulting Metallurgical Engineer, Holyoke, Mass.

Title of Paper: "SOME TRAITS AND CHARACTERISTICS IN THE WORKING OF BERYLLIUM-COPPER WIRE"

1946 — NO AWARD

1947 — NO AWARD

1948 — REGINALD S. BROWN

Chief Metallurgist, Rylands Brothers Limited, Warrington, England

Title of Paper: "WEAR RESISTANCE OF WIRE FOR WIRE ROPE"

1949 — JOHN H. CORSON

Metallurgist, John A. Roebling's Sons Co., Roebling, N. J.

Title of Paper: "WELDING IN THE WIRE INDUSTRY"

1950 — CURTIS VOIGTLANDER

Superintendent Wire Mills, Union Wire Rope Co., Kansas City, Mo.

Title of Paper: "BORAX AS A COATING FOR DRAWING HIGH CARBON STEEL WIRE"

1951 — BRUCE W. GONSER

Supervisor, Non-Ferrous Metallurgy, Battelle Memorial Institute, Columbus, Ohio

Title of Paper: "HIGH STRENGTH COPPER-SILVER, COPPER-IRON AND COPPER-IRON-CHROMIUM WIRE"

1952 — HOWARD J. GODFREY

Asst. Chief Engineer, Development & Research Div., John A. Roebling's Sons Corp., Trenton, N. J.

Title of Paper: "THE SIGNIFICANCE OF THE ELONGATION TEST ON WIRE"

1953 — VITO J. VITELLI

Process Engineer, Met. Eng. Dept., John A. Roebling's Sons Corp. Trenton, N. J.

Title of Paper: "THE DRAWING OF SHAPED STEEL WIRE"

HONORABLE MENTIONS

1935 — L. D. SEYMOUR

Metallurgist, Rod and Wire Dept., Youngstown Sheet & Tube Co., Youngstown, O.

Title of Paper: "COLD HEADING WIRE"

R. A. SCHATZEL

Superintendent, General Research Laboratories, General Cable Corp., Rome, N. Y.

Title of Paper: "HARD AND SOFT COPPER WIRE"

1936 — BENJAMIN LEWIS McCARTHY

Metallurgist, Wickwire Spencer Steel, Buffalo, N. Y.

Title of Paper: "PLASTIC DEFORMATION IN WIRE DRAWING"

1937 — ROBERT W. SANDELIN

Metallurgist, Atlantic Steel Co., Atlanta, Ga.

Title of Paper: "A METALLURGICAL STUDY OF THE FACTORS AFFECTING THE QUALITY OF GALVANIZING"

ALLAN B. DOVE

Chemical Engineer, Canada Works, The Steel Company of Canada, Ltd., Hamilton, Ont., Canada

Title of Paper: "A. C. ELECTRO PICKLING—A BETTER METHOD OF PICKLING"

1938 — RODMAN R. TATNALL

Metallurgist, Morgan Works, Wickwire Spencer Steel, Worcester, Mass.

Title of Paper: "RESILIENCE OF SPRINGS"

JOSEPH A. DOYLE

Vice President, W. S. Rockwell Co., New York, N. Y.

Title of Paper: "HEATING COPPER WIRE BARS"

1940 — H. BLOUNT

Mfg. Engineer, Point Breeze Works

and

J. E. WILTRAKIS

Engineer, Kearny Works
Western Electric Company

Title of Paper: "DESIGN AND OPERATION OF A NEW COPPER WIRE DRAWING PLANT"

1941 — RODMAN R. TATNALL

Metallurgist, Morgan Works, Wickwire Spencer Steel, Worcester, Mass.

Title of Paper: "TIME, TEMPERATURE AND SIZE IN THE HEATING OF STEEL WIRE"

1942 — FRANK W. BULLOCK

Colonel, Signal Corps, U. S. Army

Title of Paper: "THE WIRE INDUSTRY IN WAR"

1943 — E. J. CRUM

General Foreman, Bethanizing and Galvanizing Department, Bethlehem Steel Company, Sparrows Point, Md.

Title of Paper: "THE GRAPHICAL SOLUTION OF WIRE MILL MATHEMATICAL PROBLEMS"

1944 — FERNALD S. STICKNEY

Vice President and Chief Engineer, Instrument Specialties Company, Little Falls, N. J.

Title of Paper: "MAKING 'SPRING-GRADE' BERYLLIUM COPPER WIRE"

1945 — RALPH P. ELLAMS

Supervisor, Electrical Coating Development, Roxalin Flexible Finishes, Inc., Elizabeth, N. J.

Title of Paper: "THE SUCCESSFUL FINISHING OF ELECTRIC WIRE AND CABLE"

1945 — B. L. McCARTHY

Chief Metallurgist, Wickwire Spencer Steel

and

D. A. SUTCH

Metallurgist, Wickwire Spencer Steel

Title of Paper: "THE IMPORTANCE OF REDUCTION OF AREA IN THE EVALUATION OF HIGH CARBON STEEL WIRE FOR COLD DRAWING PURPOSES"

1946 — NO AWARD

1947 — NO AWARD

1948 — CARL A. ZAPFFE

Metallurgist, Baltimore, Maryland

and

M. E. HASLEM

Research Chemist, Baltimore, Maryland

Title of Paper: "EVALUATION OF PICKLING INHIBITORS FROM THE STANDPOINT OF HYDROGEN EMBRITTLEMENT."

CHRISTIAN WITTEVELD, JR.

Development Engineer, Bridgeport Brass Company, Bridgeport, Conn.

Title of Paper: "THE PROCESS OF BRASS WIRE."

1949 — E. G. deCORIOLIS

Director of Research

and

O. E. CULLEN

Chief Metallurgist
Surface Combustion Corp., Toledo, Ohio

Title of Paper: "PROTECTIVE ATMOSPHERES FOR ANNEALING NON-FERROUS WIRES"

1950 — WILLIAM L. WELLS

Asst. Supt., Wire Mills, Scovill Mfg. Co.

Title of Paper: "THE PRODUCTION AND APPLICATIONS OF COPPER-BASE ALLOY WIRE"

WALSTON CHUBB, JR.

Research Engineer, Battelle Memorial Institute, Columbus, Ohio

Title of Paper: "AN INVESTIGATION OF THE WEAVABILITY OF WIRE WITH OBSERVATIONS ON THE DEFECTS OF WIRE AND WIRE CLOTH."

1951 — CARL A. ZAPFFE

Consulting Engineer, Baltimore, Md.

Title of Paper: "SURFACE ACTIVE AGENTS AND PICKLING BRITTLENESS."

and

C. A. LITZLER

Pres., Industrial Ovens, Inc., Cleveland, Ohio

Title of Paper: "SOME DEVELOPMENTS IN NYLON AND POLYETHYLENE WIRE EXTRUSION."

1952 — JERE Y. HEISLER

Asst. General Foreman, Wire Drawing
Bethlehem Steel Company
Sparrows Point, Md.

Title of Paper: "IMPROVED LIME BATH PERFORMANCE BY RECIRCULATION."

EDWARD P. HALL

Metallurgist, Kennecott Wire & Cable Co.
Phillipsdale, R. I.

and

ROBERT D. PECK

Dist. Eng., Industrial Products Division,
Johns-Manville Sales Corp.
Boston, Mass.

Title of Paper: "DEVELOPMENT OF NEW ASBESTOS INSULATED MAGNET WIRE."

1953 — DR. F. R. MORRAL

Head, X-Ray Dept.,
Kaiser Aluminum and Chemical Co.
Spokane, Wash.

and

DR. F. A. SCHAUFELBERGER

Chemical Construction Co.
New York, N. Y.

Title of Paper: "MOLTEN SALTS FOR THE WIRE INDUSTRY"

F. W. WURTZELL, W. J. CANAVAN and B. H. MADDOCK

Development Engineers, Bakelite Company, New York, N. Y.

Title of Paper: "A REVIEW OF FLUOROTHENE IN THE WIRE AND CABLE INDUSTRY"

MORDICA MEMORIAL LECTURES AND LECTURERS FOR YEARS 1939 THROUGH 1953

OCTOBER, 1939 • PRINTED JANUARY, 1940

A Correlation of the Factors and Effects of Cold Drawing of Wire Rods

By S. A. Braley, Chf. Met. Field Engr., Pittsburgh Steel Company, Pittsburgh, Pa.

OCTOBER, 1940 • PRINTED JANUARY, 1941

The Use of Plane Polarized Light and Sensitive Tint Illumination in the Analysis of the Microstructures of Steel

By B. L. McCarthy, Chf. Met., Wickwire Spencer Steel Company, Buffalo, New York

OCTOBER, 1941 • PRINTED JANUARY, 1942

The Shape of Things to Come

By Kenneth B. Lewis, Consulting Wire Mill Engr., Worcester, Mass.

OCTOBER, 1942 • PRINTED JANUARY, 1943

Steel & Wire

By Louis H. Winkler, Met. Engr., Bethlehem Steel Company, Bethlehem, Pa.

OCTOBER, 1943 • PRINTED JANUARY, 1944

The Wire Drawing Die

By Flint C. Elder, American Steel & Wire Company, Cleveland, Ohio

OCTOBER, 1944 • PRINTED JANUARY, 1945

Carbon Steel for the Wire Industry

By A. M. Reeder, Met. Engr., Jones & Laughlin Steel Corp., Pittsburgh, Pa.

OCTOBER, 1945 • PRINTED JANUARY, 1946

Boundaries

By John C. Callaghan, Works Manager, Canada Works, Steel Company of Canada, Ltd., Hamilton, Ontario, Canada

OCTOBER, 1946 • PRINTED JANUARY, 1947

Galvanized Steel Wire

By Fred M. Crapo, President, Indiana Steel & Wire Company, Muncie, Indiana

OCTOBER, 1947 • PRINTED JANUARY, 1948

Wire in the Automobile

By F. Titus Updike, Chf. Products Engr., Products Eng'g Dept., Round Wire & Cold Rolled Products Division, John A. Roebling's Sons Co., Trenton, New Jersey

OCTOBER, 1948 • PRINTED JANUARY, 1949

54 Years in the Wire Business

By C. L. McGowan, Supt., Wire Mills, Atlantic Steel Company, Atlanta, Georgia

OCTOBER, 1949 • PRINTED JANUARY, 1950

Corrosion of Steel and Its Protective Metallic Coatings

By Allan B. Dove, Works Manager, Dominion Works, Steel Company of Canada, Ltd., Lachine, Quebec, Canada

OCTOBER, 1950 • PRINTED JANUARY, 1951

The Design and Manufacture of Woven Wire Fence

By Julian L. Schueler, Gen'l Supt., Continental Steel Corporation, Kokomo, Indiana

OCTOBER, 1951 • PRINTED JANUARY, 1952

The Fabrication of Copper Wire

By Sidney Rolle, Asst. Mgr., The Scomet Co., New York, N. Y.

NOVEMBER, 1952 • PRINTED JANUARY, 1953

Three Score and Ten Years of Wire Making

By Peter Igoe, Treas., Igoe Bros., Inc., Newark, N. J.

NOVEMBER, 1953 • PRINTED JANUARY, 1954

Reminiscings of an Old-Timer

By Charles D. Johnson, Former President, Johnson Steel & Wire Co., Worcester, Mass.

SILVER ANNIVERSARY CERTIFICATES

These certificates of The Wire Association are being awarded by the Board of Directors at the Annual Convention of the Wire Association to those who became members of our society in 1930 and who have been members continuously since the time of its organization, twenty-five years ago. These persons are:

DENIS W. ALDRIDGE
P. ALDEN BEAMAN
RICHARD E. BROWN
COL. FRANK W. BULLOCK, U.S.A. (Ret.)
RALPH K. CLIFFORD
JOHN C. COPPICK
FRED M. CRAPO
ANTHONY FOUKAL
ROSWELL L. HAMAKER
SAMUEL J. HAMMITT
ADDISON E. HOLTON
WILFRED A. HUGHES
LLEWELLYN W. JONES
WILLIAM F. KNOLL
ROBERT H. LEACH
JAMES R. LONGWELL
I. CAMERON MACKIE
CLEM L. MCGOWAN
WALTER A. RICHARDS
JORGE A. RIVIERE
DANIEL P. SOMMER
RUTH S. SPENGEL
F. PALIN SPRUANCE, Sr.
CHARLES F. VAN HOOK
LEE A. VAUGHN
LESLIE C. WHITNEY
ROBERT B. WHYTE

The Wire Association

by Kenneth B. Lewis

In his book "Steel Wire in America," in Chapter 11, Mr. Lewis has described the history of the organization and formation of The Wire Association, which is reprinted here with the kind permission of Mrs. Mary F. Lewis. The publication of the book by the Association in 1952 was made possible by the contributions of twenty-five wire industry sponsors.

* * *

Mr. Lewis, an outstanding and dominant figure in our industry for nearly half a century, was a resident of Worcester, Massachusetts. He died on November 25, 1952, about seven months after the publication of "Steel Wire in America." He was respected and regarded with affection by all who knew him and in no other single person was embodied so broad an understanding of the problems of the wire industry-technical, practical and human.

* * *

Over the years he had been a generous contributor to Wire and Wire Products' editorial columns and had served as associate editor for thirty years. His series of articles on the history of early wire concerns were especially noteworthy. He translated and adapted to American practice Maurice Bonzel's "Steel Wire," which for many years was the only book on wire making in this country.

* * *

In his early days, following his graduation from Harvard University, he worked in various steel and wire mills. He then joined The Morgan Construction Company, with whom he was associated for fifteen years until 1932, when he resigned to become a consulting engineer.

* * *

A natural scholar, with a prodigious memory, he was a fountainhead of wire lore and practice, which was reflected in his writings and his engineering services to the industry. Mr. Lewis was a charter member of The Wire Association, in the affairs of which he was active until his death.

Kenneth B. Lewis
1882-1952

I became acquainted with Dick Brown very soon after he took over the magazine, **Wire and Wire Products.** I was a steady advertiser and a contributor and we were often in conference. It was not long before he broached the matter of a Wire Association and he kept bearing down on it through all the discouragement I kept pouring on. Dick, in his modesty, likes to say that it was I and George Hartley who put the thing into his head; the truth is that it was Dick's idea entirely and George and I merely provided the occasion.

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Not that we were at all opposed. We simply thought that the wire mill operating heads as we knew them were entirely too individualistic, too stand-off, too secretive, to cooperate in any way. That's the way we had found them. Dick had gone through the experience of organizing a group of secretive, stand-offish manufacturers into an association and seeing them warm up, and he could not be talked down. In another line of work he had published a trade journal, made it the nucleus of a trade association, and seen the two support each other to perfection, and he dreamed of arranging the same union in the wire field.

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The occasion came quite suddenly early in 1930. Fred Crosby, electric engineer for Morgan Construction Co., was an active member of the Iron and Steel Electrical Engineers and was at that time on the committee arranging their annual meeting and show, and he proposed that Morgan send an exhibit to the coming show at Buffalo. The company was inclined to agree, but as wire industry was the only company product small enough to put into a hall they asked me if I cared to show some wire equipment. I offered to show a Morgan-Connor wire machine, and to operate it throughout the meeting. Wiredrawing was still very much of a delicate process and I knew that the spectacle of a continuous machine at high speed turning out first-grade wire without breakage, interruption or scrap, would attract attention.

I mentioned quite casually to Dick that I was arranging this exhibit. That was the break he was watching for. He went to George Hartley and got him to exhibit a continuous machine he was experimenting with. Then he got exhibits from Union Wire Die Co., R. B. Hayward Co. (reels) and the Ironsides Co., and engaged a booth for **Wire and Wire Products.** He started advertising in March that there would be a meeting of wire men and a program of technical papers, and he got me and several others to prepare papers. As I recall it there were papers by Dwight Granger, Clarence Arms, and Jack Spowers.

★ ★ ★

Several circumstances impressed me as I circulated among the attending wire men before the scheduled meeting. One was the very large number of these shy birds that had responded to Dick's invitation; the other was that while they were so ignorant of each other that I was kept busy introducing wire men to competitors, after the introduction they seemed to be perfectly congenial

and cooperative. I began to wonder if perhaps Dick wasn't right, and the time was ripe.

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When Dick opened the meeting we had about 200 wire men jammed into a room built for half the number. They sat on window sills, chair backs, and each other. They listened attentively, and in a rather tentative way they questioned and discussed. At a convenient break in the proceedings Dick rose up and suggested the formation of a wire association, and passed out cards which he had ready, asking for an anonymous vote, yes or no.

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The vote, when it was tallied, showed all votes in favor except one. The temper of the audience was so obvious that while the cards were circulating Dick and I, sitting on the platform, formed an organizing committee, I naming prominent wire men as I saw them in the seats, Dick immediately asking them to come to the platform. By the time the votes were in we had the thing half organized, had sketched out the constitution in the rough and appointed an organization committee to meet in New York at a later date and shape the thing up.

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According to the official minutes of the meeting, which took place June 18, 1930, the organization committee consisted of E. W. Kempton, F. A. Wilkins, E. J. Poole, E. P. Jacob, John Mordica, Rowland Hussey, W. D. Pierson, Fred Crapo, W. F. Knoll, George Paff, and R. E. Brown. A sub-Committee was named to clear away the preliminaries, Dick Brown, Bill Knoll to represent Canada, and Bill Pierson for the nonferrous side.

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The first meeting was held February 25, 1931 at the Hotel Pennsylvania in New York, rather a long stretch but in the interim Dick had been active and the members and others interested had been in touch through him and otherwise, so that the work was well along. It appears that in some way everyone has forgotten we had acquired a board of directors. I was on it, but I am innocent as a babe of any finagling; all I know is that suddenly I and Lee Vaughn, George Hartley, Charley Barningham and Dick Brown were the board. I have a vague recollection it was because our respective companies had come up with $100 each to become "company members." Officers elected to serve until the meeting the following June were John Mordica as president, vice-presidents Herbert Horsfall and Dwight Granger, secretary and treasurer R. E. Brown.

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At the first annual meeting of the association in Cleveland on June 17, 1931 the officers were confirmed in their tenure and the actions of the directors were approved, and from then onward the affairs of the association have gone along in strict parliamentary order.

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This meeting was held in conjunction with technical sessions and an exhibit of equipment, as in the preceding year, with 14 wire exhibits and three days of sessions with a total of 12 papers. We had 185 members at that time. Some little difficulty arose in connection with company memberships and support, the legal advisers of some corporations feeling that the close relationship between the magazine and the association might possibly obligate them at some future time for undefined liabilities of the publisher. This was straightened out by changes in the by-laws and the relationship remained close without being legally embarrassing. In point of fact it was R. E. Brown who carried the association on his shoulders the first few years. The officers and directors were in no way remiss but as everybody knows it takes a go-getter to bring a new thing to life and to nurse it through the illnesses of childhood. With the aid of the long distance phone Dick made the plans, got them approved, and executed them. The members knew in a remote way but we directors were keenly aware that the magazine was absorbing most of the organization and operating expense and that we were in debt to Dick Brown almost constantly for six or seven years, anywhere from $500 to $1000. Dick never complained; in fact he freely admitted that the association tied in with his publishing business very neatly and helped him enormously with his advertising solicitation. The relationship has been a happy one, profitable to both parties. It continues on the same footing and looks as permanent as anything can be in this uncertain and shifting world.

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At the directors' meeting of March 3, 1932 something new and significant came up. Ralph Clifford spoke of the Open Hearth Committee of the Mining and Metallurgical Engineers. Their meetings had come to have the form of pure discussion, questions being sent in by members or asked from the floor and discussed informally on the spot. The information brought out in this form of meeting was clearly of more interest and value than ever followed the reading of prepared texts. He suggested that we try such a meeting.

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The discussion was brisk. The value of such procedure was conceded but there was a great fear that wire men were of a special breed and couldn't or wouldn't stand up and talk in public. Ralph declared that his experience in the open hearth sessions had taught him that anybody could learn the habit if the chairman was the right sort. At this point I tried to sink under the table but was too late. It was decided to try the discussion meeting and since I knew more people in the industry than anyone else I was to be chairman.

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Accordingly, the 1932 meeting was experimental. It was held in Buffalo in October. It was a highly successful meeting, though pretty wearing on the chairman. Wire men were, in very truth, shy birds in those days. The questions, which were to have been sent in by members, were in fact worked

up by the chairman; as everyone knows, the average member in these circumstances doesn't begin to think of the affair till the last minute and then it's too late. Nobody liked to break the silence that followed the announcement of a topic, and the chairman had to be prepared to open the discussion, even to represent both sides of the argument if necessary.

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It is true that I had a wide acquaintance in the trade; there were extremely few members whom I couldn't call by name. A stock of good stories and a few monologues covered the bare spots while I gradually learned the tricks. I soon found that if a silence persisted as long as ten seconds nobody would break it and I had to speak up at once or the party would die in my lap. As I rambled along with generalities, throwing in a misstatement or a controversial opinion here and there, my eye would be busy spotting fellows who had edged forward in their seats; they were ready to lay an egg. I would break off, point to them and call their name and three times out of four they would respond.

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There was a little band of stalwarts I could count on to rally round in times of stress. As I look over the stenographic record of those sessions I find the names of George Paff, John Mordica, Bob Whyte, John Callaghan, Ralph Cohn, Ralph Clifford, Dwight Granger and John Moritz scattered through the pages fairly thickly. I could always get something from them when I was stuck.

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Bill Pierson took the two nonferrous sessions, but he insisted on my being there to stir up the animals. He insisted, and the event proved him right, that the copper folks were even more shy than the steel. So I find my name on every page of those sessions, shedding no light, but needling the copper men with controversial statements and questions. I see the names of John McKean, Paul Mueller, Carleton Ward, Paul Fast and Ernie Clark scattered through the pages.

There were four steel sessions and I was in the chair for all four. Ralph Clifford was to have relieved me but he refused on the ground that the thing was going so smoothly that he was afraid to change anything. We really did a fine job of clearing away the underbrush. Nothing very profound or detailed was touched on; we took up the common, homely fundamentals of wire production, the lime tub, how to treat it, when to dump it and why, the advantages of straight line versus circle cleaning (it was still in question at that time,) and a good deal about the technique of introducing, handling, and evaluating the new carbide dies. Nobody of that era will ever forget the afternoon we put in on sorbite. I thought it was a vital matter and I held them to it hour after hour till we had exhausted the subject of patenting. We've never had to do it again; we really cleared it up. Before we were through we had demolished the widely held belief that sorbite was the structure produced in the patenting process. We were fairly close to unanimity that our structure was a very fine, only partially resolved pearlite. I was kidded somewhat about that session, and for several years afterward the question "What is sorbite?" was always good for a laugh.

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In these four sessions we demolished quite a few superstitions and made progress toward standardizing practice in several details. Confidence seemed to beget confidence, and many a man let slip some wise words based on a lifetime of experience which he never intended to let out. We really began, at that meeting, to function as our association was intended to, and we have never slipped back.

★ ★ ★

Our 1933 meeting was held in Detroit and ran along the lines established at Buffalo. I took the first steel session, Bill Pierson handled the nonferrous, and Ralph Clifford took over the second steel session. After that we had no difficulty finding chairmen or getting discussion. The members had learned to discuss, and to preside. Some new voices heard in these sessions included those of Allan Dove, Phil Grassell, Chet Kellogg, Emil Kastien, Fred Westphal and Fred Crapo. The copper folks still hung back somewhat in attendance and in debate, and a small group of us from the ferrous mills with nonferrous experience kept the party going. This disinclination of the copper men to open up persisted for quite a spell but they finally came around, and have in recent years had some sessions that were as lively as anything ever seen in steel.

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These two years marked the high tide of free discussion. We had papers written but by agreement they were not read at the sessions. They were either abstracted or simply read by title so as to clear the way for discussion. All were published in advance so that the membership was familiar with them. After these two meetings we slowly slipped back toward the paper-reading type of meeting and eventually arrived at the compromise presented in our meetings today.

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There is still another phase of the paper-discussion matter worth notice, and the fact that it was a joke on me is no excuse for omitting it from this history. As the years passed we slipped at times into the way of permitting some very stodgy sessions; we got at one point so that we were not much better than the conventional type of technical society at whose meetings a handful of members doze or squirm on chairs listening to the speaker droning along on a discourse which they have either read the month before or know they can read in the next issue of the **Journal.** The speaker knows it is old stuff to them and he hardly exerts himself to be clear. As he finishes, the splatter of applause wakes the chairman in time to thank the speaker and ask if there is any discussion. There is none. The chairman reads the title of the next paper and sinks back to rest, and the lucky ones in the back rows steal out, one by one.

We were never as bad as this but there was a period in the early nineteen forties when we were sinking toward it fast. I fell out of the habit of attending the sessions; there was much more to be learned in the hallways, to which most of the discussion had gravitated. I beefed about this in directors meetings. Questions came up about the printing of the minutes of the meetings and their sale to members and non-members—this was before we adopted the practice of printing the discussion in the magazine—and I advocated no printing anywhere at any time nor for any price. My point was that the discussion was for those who were present, and if they could read it at leisure they would neither participate nor even attend.

★ ★ ★

While I was hot I attacked the whole spirit of the meetings and stated that we were in danger of petering out as a force in our field. I recalled the good old days and suggested that the reading of papers be forbidden and discussion encouraged again. I also suggested that we meet in smaller rooms so the feeling of solidarity would be enhanced, the floor speakers heard more easily, the damned public address system cancelled out, and a knowledge come over the membership that if they were late to the session they might have to stand up, and if they missed it the discussion was lost to them forever.

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The other members were only half sympathetic, voicing a belief that we couldn't get the old times back because of changed conditions. I got weary of arguing and of casting the only negative vote on various proposals and asked to be relieved of duty on the board.

★ ★ ★

One of my favorite cartoons is the one that shows a stuffed salmon mounted on a board and a legend that reads "If I hadn't opened my big mouth I wouldn't be here." You have guessed the end of the story! The general chairmanship of a meeting was dumped into my lap by phone. I can picture the scene; my ideas were kicked around a while and then somebody said "Why not give the damned fool the meeting and see what he can make of it?"

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Well, I worked like a dog all summer on the meeting, sent out reams of papers, letters, and mimeographs, and sweated up a list of questions. Not only that but I planted the answers among stooges so nothing could go wrong. The meeting was a sort of compromise, some papers read, some not. In trying to get prepublication of all papers I ran into snags in the routine of the magazine; Dick had commitments of long standing and had sold advertising based on them. Some papers we had to send out in mimeograph to selected members. It was more or less a mess, and so was the meeting. You couldn't quite call it a flop but it was wavering on the verge.

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I saw that the directors had been pretty near right. The liveliness of the early meetings was due in some measure to the fact that we were clearing away the fundamentals. They needed no formal presentation. Now we were getting into stuff that was too deep to leap into without thought. The good old days were gone and couldn't be brought back. I have often wondered if the same fate overtook that Open Hearth Committee.

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I think, however, that my flop had a salutary effect. It seems to me, that there has been a swing back out of the danger zone and that the meetings are on a better note.

★ ★ ★

The Wire Association is now in excellent shape. Membership is in the neighborhood of 800, two-thirds of whom attend the annual conventions. These are usually conducted independently of other organizations and in place of the former exhibits of machinery we have two or more plant visitations, one each for steel and copper men. In the past ten years or more the regional meetings have slowly grown to very respectable proportions, one day or two day affairs, often with plant visits and other features of the annual meetings. The annuals have taken place in Buffalo, Chicago, Cleveland, New York, Philadelphia, Atlantic City, Pittsburgh and Baltimore and the regionals have visited Worcester, Springfield, Pittsburgh, Hamilton, Montreal, Los Angeles, San Francisco, Atlanta, and Peoria. Attendance of 150 to 200 is not exceptional for the regional meetings and they draw together many minor executives and operatives who can't spare the time to get to distant meetings. Our secretary Dick Brown and his secretary Ruth Spengel arrange these affairs and I needn't tell the average reader of these pages that they run off so smoothly that they seem automatic. They are not. It is the essence of efficiency to work hard and seem to be doing nothing, and we are efficiently served.

★ ★ ★

Any consideration of the Wire Association brings to mind automatically the magazine, **Wire & Wire Products,** with which it is so closely associated. Those two influences have paralleled in their history the development of the third great revolution in wire manufacture, the one that took place before our eyes. Starting purely as an American revolution, it has spread around the world, nurtured at every stage by the twin influences mentioned. Those three, the revolution, the magazine, the association, are the legs of a three-legged stool; it's impossible to imagine any two without the third.

★ ★ ★

In 1926 Sylvan Hoffman, a New Yorker with publishing experience, decided to enter the field again at some vulnerable point. He was thumbing over the classified pages of the telephone directory when his eye was caught by the line "Wire & Wire Products." It sounded good, and when he found that there was no trade journal in the industry he started one under that name.

★ ★ ★

When he called on me to an-

nounce his plans I told him I was delighted at the prospect of having a medium for advertising that would waste no shots whatever. I promised him monthly full pages and all the editorial matter he wanted. In the first issue, that of May 1926, were articles by George Paff, A. R. Petterson, J. B. Nealy, Victor Boulin, and Dwight Granger. Among advertisers were Morgan, Vaughn, Shuster, Sleeper and Hartley, and, significantly, Master Wire Die Co. which spoke of dies that could replace "cast iron and the larger sizes of diamonds." This was the distant rumble of the impending carbide revolution.

★ ★ ★

Support from advertisers came quickly and generously to the new magazine. Besides those mentioned these firms became regular supporters: Koegel, Mossberg, Oakite, Watson, Union and Vianney (on diamonds), Van Miller with Steelskin, American Insulating Machinery Co., and Hubbard. Urdika Die Co. came in early, with Elmarid dies. In 1928 came Morris Simons' first offering of tungsten carbide under the name "Krupp Metal." Morris had visited Krupp in Essen and had decided to stick his neck out.

★ ★ ★

In May 1928 the name of Richard E. Brown appears on the masthead as publisher. Dick called on me soon after, and as I had by that time got over the foolish notion that a publisher had to know the industry for which he is publishing, I welcomed him heartily. The fact is, of course, that a publisher has to know only how to publish; the rest comes through his associates and his contacts.

★ ★ ★

I always find that a run through old trade journals is absorbing. It is like re-reading an old diary; news stories and articles revive memories and call to mind associated matters of all sorts, but the advertising pages are even more interesting than the editorial pages. In them you can see your industry grow before your eyes. In the February number of 1930 I see the first advertisement of Morgan-Connor machines with air cooling, and it recalls the consternation of many theorists, including myself, who scoffed at the thought that any such ex post facto treatment could affect the properties of high carbon wire. We all had to back water, and fast.

★ ★ ★

The big event of 1930 was the founding of the Wire Association. In November of 1930 appears the first advertisement of the Micro Products Co., and I recall that two years later we were debating quite briskly the place of butt welding in the wire mill.

★ ★ ★

Annealing pots get the first attention in 1930, the advertiser being Electric Furnace Co. and the item the thin steel pots lifted by the stem and cover and purged with various gases through rubber hose that ran over the working floor. In 1932 the first bell type job is advertised, an electric unit, and it is not till 1937 that a fuel fired bell type appears. Lee Wilson starts advertising in 1939 and never stopped thereafter.

★ ★ ★

The feature of 1933 is the appearance of the Vaughn Motoblox, and in 1934 there is a baker ad that indicates a turning away by the industry from the age-old practice of building their own and a beginning of acceptance of the principle that wire baking is a problem for the combustion engineer. Three years later came the flash baker.

★ ★ ★

At about this period the glamor fades out of the old files for most of us. Not only do we recall perfectly the events of 15 years ago but the events themselves are of no world-shaking importance. Fifteen years ago the pattern of the wire mill was set firmly in the mold with which we are now perfectly familiar.

Changes in Twenty-five Years

Addendum by Edmund D. Sickles, Editor, Wire and Wire Products

In this first period of the Association's history, to be commemorated at the 1954 Annual Convention, momentous changes have taken place within the industry in processing techniques and in new, faster and better equipment that approaches automation in some operations, with the result that the quality of wire and the products fabricated from wire have greatly improved, while at the same time the wire-consuming public has been able to enjoy the fruits of our industry at relatively lower prices.

★ ★ ★

Perhaps even more important than the technological changes are those of attitudes of the personnel within our industry. A spirit of good fellowship and cooperation has been fostered, resulting in a free interchange of ideas on processing and production problems, that has been of immeasurable value in promoting the progress of wire production methods.

Few are those today who feel that they have so-called "secret processes" that must be closely guarded from the ever-watchful eyes of competitors. Thus has been achieved two of the primary objectives of the Association—those of serving as a clearing house for ideas on management and technical problems and working to develop and maintain friendly relations among members.

(*Please turn to page* 1278)

SAMUEL H. HAIMS & CO.
CERTIFIED PUBLIC ACCOUNTANTS
294 MAIN STREET, STAMFORD, CONN.

SAMUEL H. HAIMS, C.P.A.
CHARLES A. TACKMAN, C.P.A.

345 MADISON AVENUE
NEW YORK 17 N.Y.

August 16, 1954

The Wire Association
453 Main Street
Stamford, Connecticut

Gentlemen:

We have reviewed the financial transactions of the Wire Association for the period October 1, 1953 to April 1st, 1954 and submit herewith as Schedule #1 a summary of the Cash Receipts and Disbursements for this period.

The Wire Association does not maintain any books or records of accounts as such and all financial transactions of the Association are handled through the accounts of the Quinn-Brown Publishing Corp. In order to ascertain the accuracy of the cash position and the financial transactions of the Wire Association, we made an audit of the books of account of the Quinn-Brown Publishing Corp. All expenses charged to the Association were properly vouchered and correctly charged.

In order to evaluate the services and expenses that were donated to the Association by the Quinn-Brown Publishing Corp. we have prepared and submit herewith as Schedule #2 a statement of expenses directly absorbed by them. There are many other convention and sundry expenses, in addition to time devoted by Mrs. Ruth S. Spengel, Assistant Secretary, and Mr. Edmund Sickels, Editor, that were also absorbed, and since we were unable to determine any actual values for these we did not include them in this schedule.

As at April 1st, 1954 the Association had a cash balance of $2,119.98 and this balance was on deposit in the South Norwalk Trust Company in the name of the Quinn-Brown Publishing Corp. Although Quinn-Brown Publishing Corp. maintains a substantial balance we recommend that a separate account be established in the name of the Wire Association and this balance of $2.119.98 be transferred thereto.

Since the Wire Association does not have any bookkeeping facilities we believe the present method is satisfactory but recommend that any excess of receipts or disbursements be transferred to or from the Association's bank account at six month intervals.

Respectfully submitted,

SAMUEL H. HAIMS & CO.

Samuel H. Haims & Co.
Certified Public Accountants

Combined Average Results
of
Johnstown & Sparrows Point

SCHEDULE #1

THE WIRE ASSOCIATION

STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS

FOR THE PERIOD OCTOBER 1, 1953 TO APRIL 1, 1954

CASH ON HAND - October 1, 1953			$ 86.48
CASH RECEIPTS:			
Dues:			
Individual Memberships - 497 @ $15.00		$ 7,455.00	
Company Memberships(24 Individuals) 3 @ $100.00		300.00	
Total Income from Dues		$ 7,755.00	
1953 Annual Convention Income:			
Income	$ 4,990.07		
Expenses	3,214.61		
Excess of Convention Income over Expenses		1,775.46	
Total Cash Receipts			9,530.46
TOTAL AVAILABLE FUNDS			$ 9,616.94
CASH DISBURSEMENTS:			
Office Salaries		$ 2,600.00	
Subscriptions to Wire and Wire Products 521 @ $5.00		2,605.00	
Directories - 521 @ $2.00		1,042.00	
Stationery and Printing		614.96	
Postage		635.00	
Total Cash Disbursements			7,496.96
CASH ON HAND - APRIL 1, 1954			$ 2,119.98

The detailed data relating to the affairs of The Wire Association is furnished in the preceding pages, so that all members may be fully acquainted with the technical and financial position of the Association.

In 1930 we had 130 members. Today there are approximately 1100 members. During this 25 year period the relationship between the Association and Wire and Wire products has grown closer and Wire and Wire Products, through its continuing annual contributions, has materially helped the Association to function and to grow.

★ ★ ★

SCHEDULE #2

THE WIRE ASSOCIATION

STATEMENT OF OPERATING EXPENSES

ABSORBED BY QUINN-BROWN PUBLISHING CORP.

FOR THE PERIOD OCTOBER 1, 1953 TO APRIL 1, 1954

EXPENSES:		
Office Salaries	$ 3,900.00	
Less: Reimbursed by Wire Association	2,600.00	$ 1,300.00
Payroll Taxes and Insurance Thereon		195.00
Subscriptions to Wire and Wire Products		
Subscription Price	$ 4,168.00	
Less: Reimbursed by Wire Association	2,605.00	1,563.00
Directories		
Subscription Price	$ 1,563.00	
Less: Reimbursed by Wire Association	1,042.00	521.00
Advertising Space in Wire and Wire Products		1,094.00
Office Rent(400 sq. ft. @ $2.50)		1,000.00
TOTAL EXPENSES ABSORBED BY QUINN-BROWN PUBLISHING CORP.		$ 5,673.00

The auditor's report covers only those contributions that could be estimated successfully and accurately. Such items as office supplies, telephone and telegraph costs, the use of furniture, fixtures, typewriters, etc., and all small miscellaneous expenses connected with the operation of the Association, have also been contributed by the magazine and, though considerable, it will be difficult to estimate them accurately. Such items have therefore been omitted from the auditor's report.

★ ★ ★

It is the purpose of Wire and Wire Products to continue its support of the Association in this manner.

HUBBARD SPO

GARRETT

THE PRODUCTS
A Complete Line from One Source
REELS and SPOOLS for

- **DRAWING and PROCESSING:**
  - (1) Steel spools and reels — welded and brazed.
  - (2) Fabricated aluminum spools.
  - (3) Cast aluminum and magnesium spools and reels.
  - (4) Metal bound plywood flange, steel or special segment hub. Patented arbor—for drawing and shipping.

- **SHIPPING—RETURNABLE:**
  - (1) Wood-Metal spools.
  - (2) Aluminum spools.
  - (3) Cast spools and reels—Aluminum and Magnesium.
  - (4) Metal bound reels—all types—nailed, plywood, dimension lumber flanges. Stave, steel, or segment drums.
  - (5) Steel spools and reels.

- **SHIPPING—NON-RETURNABLE:**
  - (1) Wood spools.
  - (2) Plywood head reels.
  - (3) Pressed board spools.

- **DRUMS (TRAVERSES):**
  - (1) Flanged steel—galvanized, painted, plain.
  - (2) Sectional steel.
  - (3) Reinforced—flanged.
  - (4) Wood segment.

- **SPECIAL TYPES:**
  - Wood.
  - Steel.
  - Cast.
  - Reels with special fittings.

- **ACCESSORIES:**
  - (1) Flanges.
  - (2) Drums (traverses).
  - (3) Reel hardware—arbor plates—washers.
  - (4) Special lagging.

All HUBBARD Spools and Reels Represent the Finest in Quality and Workmanship for their end uses.

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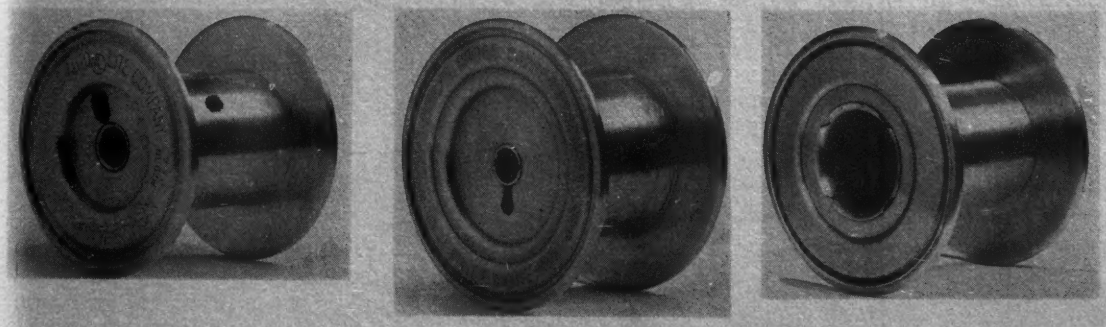
ALUMINUM SPOOLS

NEW IMPROVED



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Check with *HUBBARD* for your spool needs.

TO VISIT OUR SUITE DURING THE CONVENTION

Some Controversial Points on Dry Blending

by Milton S. Greenhalgh, Supervisor
Thermoplastic Insulation Unit
C M Laboratory,
General Electric Company
Bridgeport, Conn.

This was prepared for presentation at the Annual Convention of The Wire Association at Detroit on November 9, 1954.

There has been in the past, a great deal written on the process of dry-blending both from the standpoint of the mixing and extruding techniques. In general, today the problems of dry-blending remain essentially the same. It has been stated many times in the past that the mixing operation cannot be considered without taking into account the manner in which the dry-blend is to be finally processed. We may even go one step further and state that, in addition to the above, there are at least two other factors which must be taken into account. The first is the quality and production requirements of the finished product. The second is the type of formulation required to produce that product. In every dry-blending operation all of these factors are dependent one on the other and none of them may be changed without affecting the overall setup to various extents.

★ ★ ★

A number of the statements made in this article are not necessarily the opinions or experiences of the author, but rather the result of investigations, and consultations with other interested parties throughout the industry; the result of which in many instances verified our findings.

★ ★ ★

The first step in the process of dry-blending is, naturally, the mixing operation. The finished blend should be a dry free-flowing powder in which all the ingredients are dispersed as homogeneously as possible. The purpose of the mixing equipment is to accomplish this uniform blending, particularly from the standpoint of plasticizer distribution. This is dependent upon the absorption at a predetermined temperature of the plasticizer by the resin.

★ ★ ★

There are several types of equipment available for dry-blending on a commercial scale. All of these have certain advantages and limitations. The size of the operation, together with the type, should govern the final selection of a particular piece of equipment.

The more important classes of blenders which are being used commercially are as follows:

(1) Ribbon blender

(2) Muller

(3) Internal mixer - (semi-intensive)

(4) Conical blender - (steam jacketed)

(5) Dough Mixer - (steam jacketed)

★ ★ ★

When considering a mixer, one should take into account how easily it might be cleaned and how flexible and accurate is the temperature control. The mixing action should be positive with no dead spots so that the short cycles and variations in formulations might be realized.

★ ★ ★

A fundamental concept of mixing is that the efficiency of a particular piece of equipment depends on its mixing action which in turn will automatically control the cycle for that specific formulation being compounded.

There are several controversial points in mixing. They may be outlined as follows:

(1) Pre-screening of ingredients.

(2) Order of addition of ingredients.

(3) Pre-heating and spraying of plasticizer.

(4) Temperature of operation.

(5) Post treatment of blend such as cooling, screening, pulverizing, etc.

★ ★ ★

When the above points are taken into consideration, together with the variations in formulations and types of mixing equipment, it is no small wonder that we have rather a wide area for discussion.

★ ★ ★

This is, however, only the beginning in that the finished blend must be extruded. Here the field for discussion is definitely open, and it is not without surprise to find the most controversial point to be in the design of the screw to be used. Every extruder manufacturer has his own recommendations as to the final design for such an extruder. Basically the trend has been along the lines of longer screws with higher compression ratios. To be sure, there are other improvements which must be taken into consideration such as die design, temperature control, head design, etc.

★ ★ ★

It should always be remembered that there is one basic difference in extruding dry-blend in comparison to fused cubes or granules in

that the extruder in the case of the former must fuse and plasticize in one operation and only plasticize in the case of the latter.

★ ★ ★

At the present time, as pointed out previously, it is not possible to divorce the mixing and extruding operations. Quite frequently, in order to overcome certain difficulties encountered during extrusion, changes in mixing techniques will be made. The solution to the problem of extrusion is being approached in various ways by the laboratories of several companies connected with the industry. Their studies are basic in character and in general the feeling is that if the right type of commercial extruder could be designed then the technique of mixing would be considerably simplified. However, we are certainly moving in the right direction when we take into account the improvements made to-date.

★ ★ ★

Some of the major objections to using dry blend have been porosity in the extrusion which might range all the way from infinitely small holes, barely visible to the naked eye, to a sponge, together with pimples or "fish eyes" as the industry has come to know them. Time does not permit a thorough discussion of the causes of these two troubles.

★ ★ ★

However, the effect of porosity and undispersed particles on the electrical and physical properties of wire insulating compounds is dependent on the desired or required quality of that product. There has always been a question in the minds of many as to how uniformly the various ingredients of a dry-blend are dispersed. As wire and cable people, we are all familiar with the need for complete dispersion, particularly for certain types of insulations. There have been numerous tests made substantiating the fact that insulations made from dry blend are at least equal performance-wise to those made from pre-fused compound in the conventional manner. In addition, we are told that there is less of a heat history in dry-blending and that better results are to be expected. There still remains the fact that from time to time results have been obtained which indicate some degree of non-uniformity in the insulation. Whether this can be traced directly to the extruding or mixing operations, is rather difficult to say.

★ ★ ★

The most important ingredient in any dry-blend formulation is the resin. Everyone concerned is quite familiar, at least to some degree, with the work which has gone on during the last few years and is in progress at this moment as to the correct size and shape of the resin particle to be used for dry-blending.

★ ★ ★

I, personally, do not know how many times I have been asked the question as to why a certain resin performs well in, say, three out of five factory evaluations only to fail in the other two. The only comment which can be made is that the entire operation has to be taken into consideration. These various resin evaluations have brought out one basic thought, and that is in addition to the desirability of a definite size and shaped resin particle the uniformity of that size within as narrow a range as possible is most important. The resin manufacturers are quite cognizant of these points as evidenced by the improvements which have been obtained over rather a short period of time. In discussing this point with a resin manufacturer quite recently the statement was made that although some improvements in these refinements could be expected no major changes, whereby the processing characteristics could be markedly improved upon were anticipated in the near future.

★ ★ ★

In general, most of the discussions on dry-blend have been based on normal type formulations made with monomeric plasticizers such as di octyl phthalate. The introduction of polymeric plasticizers have presented somewhat of a problem both in mixing and extrusion. As a matter of fact, the extruding of these types of compounds from fused granules or cubes is not thoroughly understood particularly in attempting to obtain consistent physical properties.

★ ★ ★

Recently, there has been considerable work done with rigid and semi-rigid formulations. These two present a problem in extruding from dry-blend due to the high temperatures encountered during processing. In fact, the fabricators of such compounds do not always recommend the processing of even semi-rigid formulations from dry blend because of the inconsistent results obtained.

★ ★ ★

It is admitted that each phase of the dry-blending operation such as mixing and extrusion could be discussed to a much greater length, but time does not permit this. The extrusion and mixing processes have been covered by the author in more detail in two papers written previously and delivered at the National S.P.E. conventions in 1952 and 1953 respectively. Perhaps in the ensuing question period, some interesting points may be brought out for discussion.

★ ★ ★

In closing, an attempt has been made to show first that the overall picture must be considered in the evaluation of a dry mix operation, and second that there may be some critical problems encountered in processing all types of formulations in that set-up.

DPR—New Uses in Cable and Communications

by Malcolm E. Doane
H. V. Hardman Company Laboratory
Belleville, New Jersey

This paper was delivered before the Signal Corps Wire and Cable Symposium in Asbury Park on December 10, 1952. In it the author describes the properties of natural rubber in polymerized form as an insulating material for electric wire and cable.

The material I'm going to talk on is probably brand new to many of you in the cable and communications field. It's DPR—natural rubber in depolymerized form. Its flowable compounds are doing things in your field that can't quite be done with anything else. I'll try to explain how it's being used and how you might use it.

★ ★ ★

The base of these flowable compounds is the DPR itself. We treat natural crude rubber by a thermochemical process to produce the stable, liquid form. In this condition you have a flowable rubber without solvent or water. I want to impress upon you that DPR is not a solvent solution of rubber nor is it a latex. It is all rubber hydrocarbon. Note the viscosity of this sample—this is our standard low viscosity DPR. DPR is also produced in other viscosities, the medium and high. For a practical comparison I might liken the consistency of the low viscosity DPR to that of molasses at room temperature.

★ ★ ★

Some of you will want a little more precise values for these viscosities—they run about like this: at 150°F. the low viscosity is about 18,000 centipoises while the high viscosity runs over 100,000 cps. If we raise the temperature to 250°F. these values drop considerably. The low viscosity now is only 3,000 cps. while the high has dropped to 18,000 cps. The viscosity is basically a function of the molecular weight of the depolymerized rubber. That is to say, the ratio of high molecular weight rubber to low molecular weight rubber determines the final viscosity. Since the chemical degradation of the rubber molecule can be controlled in our manufacturing process it is possible for us to produce DPR with a viscosity ranging anywhere between the high and the low values already given. So far we haven't arrived at any absolute values for the molecular weights of these constituent fractions.

★ ★ ★

Since DPR is a modified form of natural rubber it remains that its specific gravity is about .92—the same as natural rubber.

★ ★ ★

Someone will surely ask if synthetic rubber can be depolymerized. We have done much work on the depolymerization of numerous types of synthetic rubbers but have found that they do not respond to depolymerization processes. They seem to cross link and do not become flowable or else they break down and can not be cured again to the solid state.

★ ★ ★

The color of uncompounded DPR resembles "black strap" molasses. In thin films it is light amber. It may be compounded, however, with regular rubber colors and therefore colored stocks are easily made.

★ ★ ★

DPR is soluble in both aromatic and aliphatic hydrocarbons, such as toluene and common petroleum naptha. It is also soluble in some ketones and chlorinated solvents. Equipment may be readily cleaned using any of these.

★ ★ ★

This is what DPR looks like. Although this may be a new material to you, depolymerized rubber has been under constant development by the Hardman Co. for 27 years.

★ ★ ★

In regard to compounded materials, DPR has a very flexible personality. Depending upon the compound, stocks ranging from a flowable molasses-like material to a very stiff material suitable for trowelling application may be produced. While DPR compounds normally exhibit good insulating properties it is possible to make stocks which are highly conductive thru the incorporation of acetylene blacks. The hardness of cured DPR stocks can be varied to run from a gelatinous composition to the ebonite or hard rubber state. I will say, however, that in the softer stocks tensile strength, elongation and modulus are not comparable to vulcanized conventional milled rubber compounds. In addition to being able to compound hard and soft stocks, insulating and conductive stocks, the time and temperature necessary for curing is also variable, depending on the formulation of the compound.

★ ★ ★

Up to this time the most interest in the electrical field in DPR compounds pertains to their use as a moisture sealant and insulating material. Due to the unique property of being able to be formed without the use of pressure, DPR compounds are finding application in the embedment of delicate electronic parts. By using a self-setting type of compound it is possible to embed parts which would not stand the high temperatures necessary in a hot melt or oven curing type of compound. If a soft DPR stock is used it is possible to shock mount these delicate components in the same operation as they are potted using just one material.

★ ★ ★

A splendid example of this type of material is our #46 Permo Com-

pound. This material has found wide use in the spiral-four connector as manufactured by several prominent cable companies.

★ ★ ★

The #46 is a self-setting material, and since such is the case, is supplied in three parts; one part contains a masterbatch of the required accelerators, the second part contains the fillers and sulfur (which, by the way, is under 2%), while the third part is straight DPR. The three part system is necessary to insure maximum stability prior to mixing.

★ ★ ★

Upon mixing the three parts together in the correct proportions, the material has a pot life of from 3 to 7 days, depending upon the temperature maintained and the maximum viscosity allowable for handling.

★ ★ ★

Some of the advantages of this compound are good adhesion to such materials as brass, polyethylene and various molded plastics. Since the compound sets to a soft gummy-like mass very little shrinkage is evident, and therefore no moisture seepage along the walls of the connector and along the insulated conductors themselves has been noted. Insulation resistance values in excess of 500-000megohms have been found even after immersion in water.

★ ★ ★

The ease of assembly using this compound is noteworthy. The connectors may be filled with compound by means of a gear pump which may be regulated to deliver a specific volume of material. This pump is a commercial item and may be seen at our display at the rear of the auditorium. After filling and assembling the connectors they may be tested immediately since the electrical properties do not vary appreciably between the set and unset compound. Upon standing for about 7 days at room temperature the compound sets. When set, the #46 Permo Compound does not cold flow, or even flow at 200°F. It has been found to be resilient at temperatures as low as —67°F.

★ ★ ★

This procedure would not be possible but for the fact that DPR does not contain solvents and is 100% rubber solids.

★ ★ ★

Doing a complete about face, DPR semi-conductive materials are also finding application in the Cable Industry as a means of shielding.

★ ★ ★

The term "shielding" in electrical engineering describes a practice of confining electric and magnetic fields to a desired region. The purpose of shielding is threefold, namely:

1. **Confinement of disturbances originating within a region of high electric or magnetic field.**
2. **Isolation of a region of high electric or magnetic field from external disturbances.**
3. **Prevention of secondary effects within a region of high electric or magnetic field which may be detrimental to the successful operation of materials in this region.**

★ ★ ★

Cables may be shielded for any one or all of the above reasons. In the first two cases, the cable dielectric is used in a field of high electric intensity and may be in the vicinity of components of a very sensitive pick-up system operating in a region of high electric or magnetic field.

★ ★ ★

When properly used, semi-conductive DPR is a valuable material to be used by the cable engineer to supplement metallic shielding since it may be applied in thin continuous layers. The physical properties of semi-conductive DPR approach those of the dielectric and its electrical properties approach those of the metallic conductor or shield. The material may be used for any of the three fundamental purposes of shielding for electric fields—to confine disturbances within the dielectric to the cable itself, to confine the electric field to the primary dielectric, or to reject external disturbances from the electric field in the dielectric.

★ ★ ★

It is possible to get much more highly conductive stocks using DPR than with conventional natural rubber. When carbon black is dispersed in crude rubber on a rubber mill there is a tendency to over-disperse the carbon particles. This has a tendency to reduce the conductivity of the stock because many particles are coated with an insulating layer of rubber, thus reducing the contact between the particles of conductive black. In case of DPR this over-dispersion can be eliminated because the shearing effect of the type mixing required is not nearly as great as that gotten when a rubber mill is used. Because of this an even dispersion is obtained before the carbon particles become coated.

★ ★ ★

Many new applications are under development at this time. Among the most interesting of these is the problem of enclosing transformers in a rubber casing to protect them from physical shock and moisture seepage. At the present time these coatings are molded about the transformers in conventional molds using heat and pressure. By choosing the appropriate DPR compound the transformers can be enclosed using a simple casting technique. The elimination of the heavy molds and presses necessary for molding in itself constitutes a considerable saving in manufacturing costs. Actually all that is necessary for producing this item using a DPR compound are suitable molds, which may be little more than tin cans, and an oven for curing the castings.

★ ★ ★

One of the great advantages of DPR is the fact that heavy equipment such as rubber mills and banbury mixers are not needed. Many stocks may be compounded using a suitably designed agitator in a drill press. Commercial mixers, such as the Hobart mixer, will also prove ideal for certain compounds.

★ ★ ★

Compounding DPR stocks is relatively simple. The basic constituents are a filler such as zinc oxide or even clay, the vulcanizing

(*Please turn to page* 1252)

Comments on Dr. Saxl's Article on Determination of Wire Tensions

In the July, 1954, issue of Wire and Wire Products there appeared an article entitled "Determination of Correct Wire Tensions" by Dr. Erwin J. Saxl.

In the text the author uses as a premise the statement that 100,000 to 150,000 pounds per square inch is commonly considered as the ultimate breaking strength of copper.

Three outstanding authorities have questioned this in letters that we quote:

Letter No. 1

"The July 1954 issue of "Wire and Wire Products" carries on page 752 an article by Dr. Erwin Saxl entitled "Determination of Correct Wire Tensions" which in the eighth paragraph reads in part as follows:

"(This is only about 10%-15% of the 100,000-150,000 pounds per square inch commonly considered as ultimate breaking strength for copper)"

This statement is incorrect and if left unchallenged can be the source of future difficulty from persons who not being familiar with the facts, will be inquiring for copper having the above characteristics. The breaking strength of hard drawn copper wire is in the range of 60,000-70,000 pounds per square inch and 30,000-40,000 pounds for soft annealed wire. These facts could have been ascertained by a few tests or by consulting the metallurgical literature on copper."

★ ★ ★

Letter No. 2

"I have reviewed the article by Dr. Saxl in the July issue of "Wire and Wire Products." His statement that "100,000 - 150,000 pounds per square inch is commonly considered as ultimate breaking strength for copper" is obviously wrong, for hard-drawn copper will have a tensile of only about 65,000 pounds per square inch while annealed copper will run about 35,000 pounds per square inch. In Table No. 1 which is captioned "Safe Operating Tensions for **Annealed** Copper Wires," he has used the range of 100,000 - 150,000 pounds per square inch for strength instead of a value of about 35,000 pounds per square inch, and assumed that a load of 15,000 pounds per square inch is a safe operating tension. On this basis, the assumed loading will be equivalent to 43% of ultimate strength of annealed copper which, of course, is excessive.

★ ★ ★

In Professor Allison Butts' recent book, "Copper—The Science and Technology of the Metal, its Alloys and Compounds," he shows on page 374 a yield strength value for annealed tough pitch copper wire of 5,500 pounds per square inch at 0.5% strain. Since the main purpose of the instrument is to maintain the tension in the wire below the point "where the elastic recovery of the wire ceases," it is apparent that the "Safe Operating Tension" values shown in Table No. 1 are too high for any reeling operation on annealed copper wire."

Letter No. 3

"The standard breaking strength range for hard drawn copper is 60,000 lbs. to 70,000 lbs. per square inch. Annealed copper falls in the 35,000 to 40,000 lbs. per square inch range.

★ ★ ★

"We feel sure that the author of the article must have been thinking in terms of rather high strength steel in making his reference to 100,000 to 150,000 lbs. per square inch breaking strength values."

Dr. Saxl's Comments

"Upon return to my desk I find your letters citing objection made by members of the Wire Association. Please give the gentlemen my thanks; I agree with them entirely. I found the error when I received the article.

★ ★ ★

In my article on "Determination of Correct Wire Tensions" there is an error. It was stated that the figures shown in Table 1 represent 10-15% of the estimated breaking strength of from 100,000 to 150,000 pounds per square inch. This is incorrect.

★ ★ ★

The approximate tensile strength for soft annealed copper wire should correctly read 30,000 - 40,000 pounds per square inch. The breaking strength of hard drawn copper wire is in the range of 60,000 to 70,000 pounds per square inch.

★ ★ ★

Since the operating tensions were calculated for the safe tension of only 15,000 pounds per square inch, the important Table 1 remains correct.

★ ★ ★

The permissible tension varies, of course, with the preparatory operations to which the wire is subjected. If wire is not to be irreparably deformed, the operating tension should be within the range in which Hook's law holds rigorously; that is to say that stress is then proportionate to strain and that elastic recovery is practically complete after deformation.

★ ★ ★

Theoretically, the limit of elastic recovery should be determined under performance conditions for each type of wire, thus including the entire wire preparatory history for a given operating position. Practically, however, this is not always required.

★ ★ ★

As a rule, the Johnson elastic limit is considered safe. This is the

(*Please turn to page* 1278)

Government Wire Production Information

Metallurgical Fluorspar to be Stockpiled

The General Services Administration has announced it has received an interim directive from the Office of Defense Mobilization to buy metallurgical grade fluorspar for inclusion in the national stockpile.

★ ★ ★

The Directive calls for purchase of concentrates from domestic ores only, and the amount to be bought will not be disclosed publicly, in keeping with stockpile policies.

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Metallurgical grade fluorspar is used principally in the production of steel, where it acts as a "flux" during manufacture.

★ ★ ★

The various grades of fluorspar are produced in several western States, with substantial quantities coming from Illinois and Kentucky.

★ ★ ★

The material is on the strategic and critical list for stockpiling because during emergency periods domestic requirements exceed production and imports would be necessary.

★ ★ ★

Foreign sources are Mexico, Canada, and several countries in Europe and Africa.

Aluminum Production

The General Services Administration has announced that aluminum production from new facilities created under the expansion program will reach 301,485,000 pounds during the third quarter of 1954.

★ ★ ★

A minimum of 63,345,000 pounds of aluminum is required to be made available to non-integrated users (who fabricate but do not produce the metal). During the second quarter of 1954, 80,000,000 pounds were made available to the non-integrateds.

★ ★ ★

GSA said that there have been no instances in the last nine months in which non-integrated users have advised that they were unable to obtain metal. GSA also stated it had been advised by the producers that considerably greater quantities of aluminum are available to the non-integrateds than the amount required to be set aside.

★ ★ ★

Total production of aluminum during the second quarter of this year was 303,407,000 pounds. During the first quarter it was 260,887,000 pounds.

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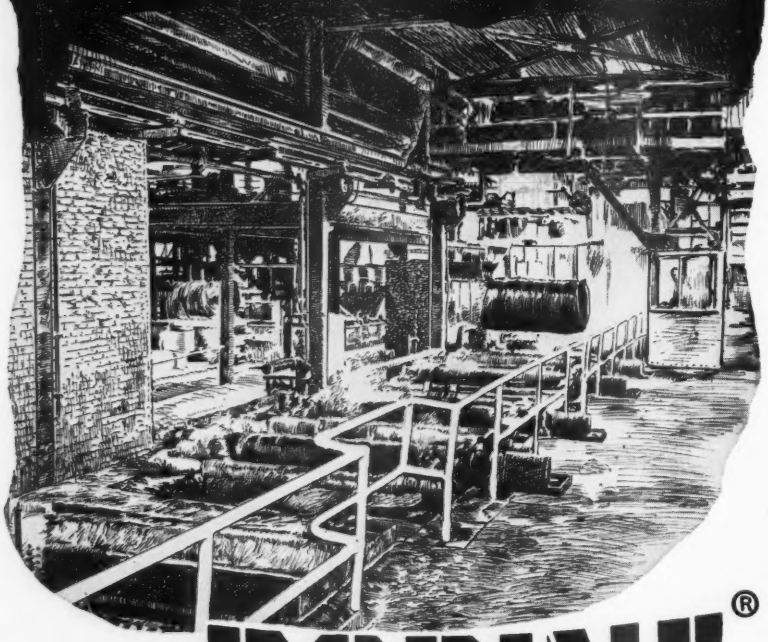

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ABSTRACTS

TINY THERMOCOUPLE MEASURES REACTOR TEMPERATURES

Argonne Nat Lab. Chem. & Engg News 1954 Vol 32 (16) p 1568 (Apr 19)

Thermocouple constructed by inserting thin insulated Constantan wire into small dia Inconel tube of hypodermic type, and drawing tube through die on drawbench, so gripping and sealing wire inside tube. Tube and wire, as dissimilar materials, comprise couple components. Thermocouples constructed as thin as 0.04 in. dia, 20 ft long, recording temp to 1,250 deg F (677 deg C). 1 illustr.

Y **C 11.0**

★ ★ ★

EINHEITLICHE GRUNDLAGEN ZUR AUSWERTUNG VON FORSCHUNGSERGEBNISSEN IN DER SPANLOSEN FORMUNG. UNIFIED PRINCIPLES FOR THE EVALUATION OF EXPERIMENTAL RESULTS OF CHIPLESS FORMING

H. J. Kuehne. Technik 1954 Vol 9 (3) pp 143-148 (Mar); (4) pp 225-231 (Apr) (In German)

Basic principles and underlying hypotheses of unified method for determination of force, work and power required for any chipless method of forming of metals. Basic equation of Fink determines only ideal force or work requirement without consideration of losses which have to be assessed from practical experience. Log representation of Fink's equation clearest. Introduction of basic variable gamma characteristic of particular forming process. Specific values only, not absolute values, should be given. Examples treated in detail: upset forging, extrusion, swaging and wire drawing. 16 illustr, 38 ref.

H **C 11.0**

★ ★ ★

DE SLIJTAGE VAN DIAMANTEN TREKSTENEN. THE POLISHING OF DIAMOND DRAWING DIES

L. Schultink, H. L. Spier, A. van de Wagt. Philips Techn Tijds 1954 Vol 16 (3) pp 87-94 (Mar) (In Dutch)

General article dealing with atomic structure of diamond, from which vector hardness in different directions results. Discussion of structure of diamond as given by V. Stott. Influence of crystal orientation on die hole; burning of holes in diamonds in an oxygen-temp about 850 deg C. Electron micrographs at 10,000 x of etch tests on diamond surfaces orientated according to (110), (100) and (111), with relative etching times of 5, 8 and 11½ min. 9 illustr.

G **C 2.2: D 11.0**

★ ★ ★

ON THE USE OF WIRES EMBEDDED IN NUCLEAR EMULSIONS TO INVESTIGATE REACTIONS INDUCED BY HIGH-ENERGY NEUTRONS

E. G. Silver, R. W. Waniek (Harvard Univ). Phys Rev 1954 Vol 94 (3) p 769 (May 1)

Abstr of paper to Am Phys Soc mtg, Jan 28-30, 1954. Previous experiments suffered from lack of unambiguous identification of type of nucleus in which event occurred. This obviated by

use of thin filaments embedded in Ilford G-5 electron sensitive emulsions. Nylon, molybdenum and tungsten filaments, 10 to 28 micron dia, so far used. Many problems successfully overcome by this means.

Y **C 11.0**

★ ★ ★

THERMIONIC AND SURFACE PROPERTIES OF TUNGSTEN CRYSTALS

G. F. Smith (Calif Inst Technol). Phys Rev 1954 Vol 94 (2) pp 295-308 (Apr 15)

As result of working during drawing of 0.005 in. tungsten wire, crystals grown by 'doping' normally orientated with face diagonal very nearly parallel to wire axis. Doping consists in adding 1% of mix (Na_2O, KrO, $CaCl_2$, Al_2O_3 and SiO_2) before sintering; wire subsequently recrystallizes into crystals occupying entire cross-section of wire. Plateau-like surface structure found on crystals. 13 illustr, 51 ref, 4 tables.

Y **C 11.0**

★ ★ ★

GROWTH AND SURFACE PROPERTIES OF TANTALUM CRYSTALS

M. H. Nichols (Calif Inst Technol). Phys Rev 1954 Vol 94 (2) pp 309-313 (Apr 15)

Method consisting of moving temp gradient for producing cm-long crystals in commercial tantalum wire (0.005 in. dia, polished to remove die marks) described. Method less successful on commercial molybdenum wire. Plateau-like structure, similar to that of tungsten, observed on both tantalum and molybdenum crystals. [See also above.] 5 illustr, 18 ref, 1 table.

Y **C 11.0**

★ ★ ★

A CENTURY OF WIRE-WORKING AND WIRE-WEAVING

Begg, Cousland & Co Ltd, Glasgow. Wire Ind 1954 Vol 21 (247) pp 708-709 (July)

Development of firm, established in 1845 by W. Riddell near Glasgow. 1 illustr.

G **C 11.0**

★ ★ ★

THE DRAWING OF NONFERROUS METALS AND ALLOYS

N. S. Dnestrovski. Sowjet Buchneuerschein 1954 (236) p 16 (June 29) (Original in Russian)

Book, Metallurgizdat, 288 pp. Explanation of drawing processes with detailed analysis of multiple drawing wire. Description of main and auxiliary equipment for drawing wire, bars and tube as well as annealing, pickling and finishing of drawn semi-finished products. [Book not in library of Ind Diamond Inf Bur.]

G **C 11.0**

★ ★ ★

KUPFERDRAHT. COPPER WIRE

H. Feldmann. Draht 1954 Vol 5 (5) pp 167-172 (May); (6) pp 212-216 (June) (In German)

Article discusses historical development and properties, in particular specific resistance and strength properties (shown in many diagrams). Drawing process and factors influencing wire drawing explained. Description of some new ma-

Forming the above Special Phillips Truss Head in two blows presented a difficult upsetting task. This was successfully accomplished when the manufacturer specified Keystone "Special Processed" Cold Heading Wire.

The uniform grain flow properties of "Special Processed" Wire provided the desired upsetting and die forming qualities necessary to form the thin head section without distortion or cracking. The structural soundness and uniformity of "Special Processed" Wire further proved itself by trouble-free machine operation, longer die life and a finished product of the highest quality.

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. . . Houghton has developed a wide range of lubricants for wire processing and fabricating equipment, including cold headers. Check your specific lubrication needs with the Houghton Man.

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"1001 PRODUCTS TO IMPROVE PROCESSING"

chines for fine wire drawing differentiating between machines with and without slip. 22 illustr, 3 tables, 6 ref.

G **C 11.0**

★ ★ ★

GRUNDSAETZLICHES ZUM SCHMIERZORGANG UND ZUR FRAGE DER SCHMIERMITTEL ZUM ZIEHEN VON EISEN- UND STAHLDRAHT. BASIC DATA ON THE PROCESS OF LUBRICATION AND THE PROBLEM OF LUBRICANTS FOR DRAWING IRON AND STEEL WIRE

W. Heidenhain. Draht 1954 Vol 5 (7) pp 273-274 (July) (In German)

Extract from publication 'Aus der Facharbeit auf dem Gebiete des Eisenhuettenwesens in den Jahren 1939-1945, Ganzleinenausgabe, 427 pp, 1953, Varlag Stahleisen, Duesseldorf. 1 table.

G **C 11.0**

★ ★ ★

NEUES VERFAHREN ZUM MESSEN DER FUEHRUNGSLAENGE VON ZIEHHOLEN. NEW METHODS FOR MEASURING THE BEARING LENGTH OF DRAWING DIES

W. Lueg. Stahl & Eisen 1954 Vol 74 (14) pp 874-876 (July 1) (In German)

Since instruments using needles cannot be used for very small holes, suggestion made by P. Rump of using microscopic observation for fine holes. Image of bore is focused in 2 planes and one measurement taken from entrance, and other from exit side. A dial gauge accurately measures difference, ie bearing length. Method protected by DBP 899,112 and 915,991. As in described method, table carrying drawing die has to be rotated by 180 deg about horizontal axis; same method applied for needle instrument using only single needle (Megazet instrument). 4 illustr, 3 ref.

G **D 11.0 : D 15.0**

★ ★ ★

THE SURFACE QUALITY DEFECTS OF STEEL WIRE

L. Mankher. Kohaszati Lapok (Hungar Journ Metall) 1953 Vol 8 (86) (11) pp 225-239 (Oct); noted Hungar Techn Abstr 1954 Vol 6 (2) p 63 (Original in Hungarian)

X **C 11.0**

★ ★ ★

THE [WIRE] DRAWING

K. P. NESABYTOVSKI. Sowjet Buchneuerschein 1954 (240) p 22 (July 19) (Original in Russian)

Book, Mashgiz, 40 pp. 2nd ed. (From series: Popular Scientific Library of the Machine Worker). Description of modern drawing methods and scientific principles for economic working of drawing machines. [Book not in library of Ind Diamond Inf Bur.]

G **C 11.0**

★ ★ ★

Inquiries regarding any of the foregoing items should be directed to the Industrial Diamond Information Bureau, 34 Holborn Viaduct, London, E.C.1., Eng., through whose courtesy these abstracts are published.

WIRE MACHINERY AT HANOVER
Anon. Wire Ind 1954 Vol 21 (247) p 709 (July)

Short note dealing with coil winding machines, also mentioning diamond drawing dies and further development of reciprocating and rotating diamond sawing wire.

G C 11.0 : D 11.0

Wire and Cable Symposium

The Third Annual Wire and Cable Symposium jointly sponsored by the **Signal Corps Engineering Laboratories,** Fort Monmouth and by the **Wire and Cable Industry** will be held December 7 through 9, 1954 at the Berkeley Carteret Hotel, Asbury Park, New Jersey. A program is being arranged covering wire and cable materials, their characteristics and uses; wire and cable constructions, together with manufacturing and equipment problems; field construction methods; and uses in systems operation. All companies and agencies represented at previous Symposia will be contacted. Others interested in attending may obtain further details by contacting **H. L. Kitts, Coles Signal Laboratory,** Fort Monmouth, New Jersey; telephone: Eatontown 3-1000, extension 81188.

Survey on Fire Hazards in Metalworking

In recent years the metalworking industries have been beset by fire. Since 1942 large-loss fires in both heavy and light metalworking plants have increased 17 times, due in part to higher concentration of values in buildings, equipment and products exposed to fire and to hazardous new auxiliary processes.

★ ★ ★

These facts are brought out in a 57-page survey on fire hazards and safeguards for metalworking industries issued recently by the **National Board of Fire Underwriters.**

★ ★ ★

According to the Board, there were about 175 large-loss fires—those that result in damage of $250,000 or more—in the metalworking industries between 1942 and 1953, with an aggregate loss of some $150,000,000, as contrasted

a name that has stood for sturdy, dependable yarn beams in the Textile Industry for over 20 years . . .

MILTON MACHINE offers you A RELIABLE SOURCE OF

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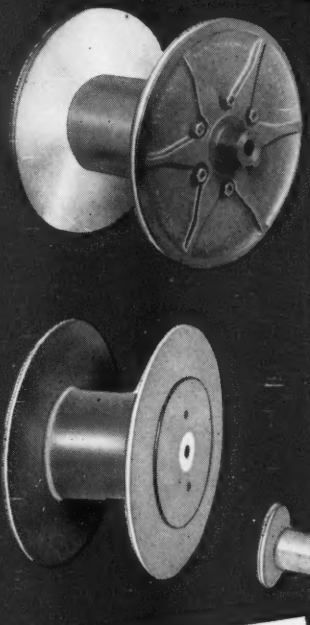

HEAVY DUTY REEL

Shown at left is one of several wire rope or cable reels designed and manufactured over the past several years to meet the heavy duty service of a wire rope manufacturer. Flanges with rope brake rim grooves are heavily ribbed semi-steel castings.

WELDED STEEL REEL

At left is one of several welded reels made to wire rope manufacturers' specifications for replacement of light weight pressed steel reels which failed to hold up under heavy duty service.

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Another of our products for the unusual service applications of the wire industry.

INQUIRIES INVITED . . . Send us a sketch or print stating the limiting dimensions and services required—or write or phone. Our field engineer-representative will be glad to describe our facilities for supplying you with special heavy duty processing reels, spools or bobbins.

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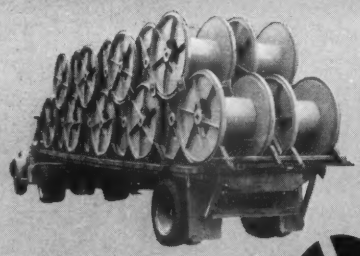
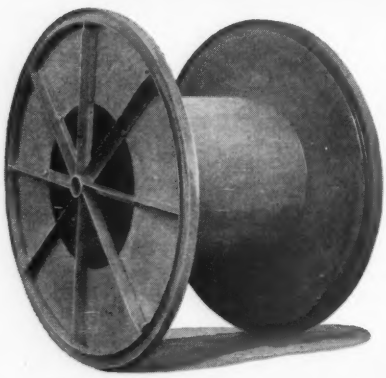


NYECO Steel Shipping Reels



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because they cost so little more, last *12 times* longer than wooden reels, require minimum maintenance. Rugged weatherproof, splinter-proof, warp-proof construction protects costly cable against damage due to dropping, bouncing, rough handling. It doesn't pay to risk an investment of thousands on inferior reels.

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with the period from 1931 to 1942, when only 18 large-loss fires were reported with aggregate losses of $8,500,000.

★ ★ ★

The survey points out that many new factors have entered the fire safety picture in recent years, but, more important, the presence of old fire causes in a more pronounced form. These are large-unprotected areas, the use of woodwork and plastic materials in fabrication processes, as well as the use of flammable liquids.

★ ★ ★

To receive a copy of this survey, "Fire Hazards in the Metalworking Industries," write to the National Board of Fire Underwriters, Research Department, 85 John Street, New York 38, N. Y. If you are in the Middle West, write to 222 West Adams Street, Chicago 6, Ill., and if west of the Rockies, to 465 California Street, San Francisco 4, Cal.

New Standards Announced by ASA

Twelve American Standards for insulated wire and cable have been released by the **American Standards Association.** These standards were developed by the **American Society for Testing Materials** and submitted to ASA for approval.

★ ★ ★

Eleven of these standards are designated as C8.23-33 and include specifications for such characteristics as physical properties, voltage test, insulation resistance, thickness and workmanship, for the following insulation compounds: performance synthetic rubber, heat resisting synthetic rubber, rubber sheath, heat resisting rubber, performance rubber, GR-S synthetic, ozone resistant type insulation, polyvinyl, GR-M polychloroprene sheath (where extreme abrasion resistance is not required), GR-M polychloroprene sheath (regular), and thermoplastic vinyl polymer.

★ ★ ★

Another standard, C8.22, outlines methods of testing rubber insulated wire and cable. This

American Standard shows how to perform tests of physical properties, aging tests, voltage tests, insulation resistance measurements, moisture absorption, ozone resistance and flame tests.

MEK-2110 Time Delay Relay

The MEK-2110 is an electronic time delay relay designed for use wherever a dependable, easily adjustable time delay is required. Incorporated are such advantages as ease of installation, long life, and timing accuracy. Conservative electrical design and simplicity of operation are stressed. Two timing ranges are available, 1.5 to 120 seconds or 0.75 to 60 seconds. DPDT load contacts are provided for control of external circuits. Load contacts are rated at 5 amp., 115 V. A.C.

★ ★ ★

Repetitive accuracy with constant line voltage, is better than plus or minus 2%. Variations in line voltage will cause a slight increase or decrease in the preset time. An increase in line voltage of 10% will decrease the timed interval approximately 1%. A decrease in line voltage of 10% will increase the timed interval approximately 1%. Reset time of 3% of set time must be allowed between operations. A calibration control compensates for variations due to tolerances in components. This control is set at the factory to produce maximum rated time at rated line voltage.

★ ★ ★

The MEK-2110 offers advantages over ordinary timers in that it allows a choice of two sequences of operation. In Sequence A, load contacts are de-energized during Reset and Timing, and energized when Timed Out. In Sequence B, load contacts are energized during Reset, de-energized during Timing, and energized when Timed Out. Sequences are obtained by interchanging terminal strip connections.

★ ★ ★

The relay is recommended for interval timing or time limiting operations. Typical applications

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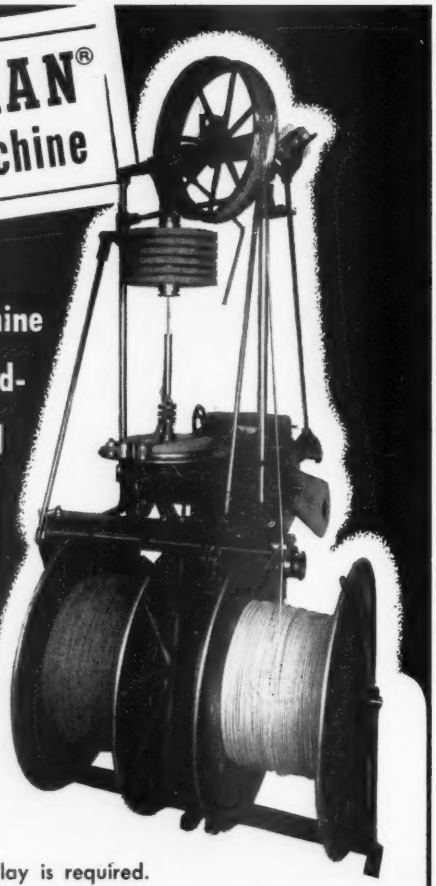

A Special Wardwell Machine With a Long and Outstanding Record of Successful Performance!

Applies Narrow Width Tapes (up to 1" wide) To Electrical Conductors.

Has electric stop-motion and capstan-release mechanism which permits the conductor to be retracted and placed in position for re-run after supply has been replenished.

"Reeves" variable speed unit gives quick adjustment when change of lay is required.

Adjustable traverse mechanism lays material evenly on windup reel.

Other Features Include These:

- Machine will produce 58 feet per minute giving a maximum lay of 1". Minimum lay is 3/8".
- Serving head speed 700 R.P.M.
- Driving pulley 8" diameter; 1¾" belt. Speed 330 R.P.M.
- Ratio serving head speed to pulley speed 2.12 to 1.
- Capstan 18" diameter, 3" face.
- Opening through serving head 5/8" diameter.
- Maximum diameter of flexible conductor 3/8".
- Supply packages 12" diameter, 1" maximum width, 3/8" minimum width. Size of hole in package 3"
- Supply tube will hold 9 packages, 1" wide, sufficient for normal lengths of conductors.
- Maximum power requirement 3/4 H.P. including power transmission.
- Motor drive furnished upon request.
- Stands can be furnished to take reels as follows:
  30" diameter and up to 13" outside width
  30" diameter and up to 16" outside width
- Special wind-up driving parts required for reels with drums under 8" diameter.
- Reels are not included with machine.

NOTE: Serving Head normally runs clockwise, but can be made to run counter clockwise upon request.

Complete detailed information on "Wardwellian" Tape Serving Machine on request.

There are nearly thirty applications for Wardwell equipment, including Braiding, Shielding with wire, Tape Serving, Yarn Serving, Asbestos Serving, Paper Serving, Armor Serving and Resistance Wire Serving.

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JAMES MACKIE & SONS, LTD., BELFAST, IRELAND

are on heat treating machines, injection molding machines, machine tools, etc. Two or more units may be connected together for complex timing sequences. Open or enclosed forms are available as well as remotely adjustable units.

★ ★ ★

Features, specifications and general information are presented in a looseleaf catalog section and price list. Application data and diagrams are shown with photographs of the various forms available. Write **Machinery Electrification,** Northboro, Mass.

14,500 Feet of Hazard Cable Used to Erect World's Tallest Structure

Erection of the world's tallest man-made structure, a 1,572-foot television transmitting tower for Oklahoma City Station KWTV, was completed in record time in September.

★ ★ ★

The first section of the 1,323,392-pound tower was hoisted into place on June 14. Since then, additional

Hoisting Unit used in erection of TV tower.

30-foot sections have been rising on the Oklahoma skyline, each carefully lifted into place by high strength hoisting cables and wire rope slings. One of the most unusual fabricating and erection jobs ever attempted, the triangular tower will give KWTV the greatest coverage pattern of any station in the Southwest.

★ ★ ★

Movements of the hoisting unit, located approximately 200 feet from the tower, and the electrically-operated boom inside the tower were coordinated by means of an intercom system. More than 14,000 feet of preformed Hazard hoisting cable, produced by the **Hazard Wire Rope Division of American Chain and Cable Company,** was used in all, together with winch lines and slings with Dualoc safety endings. The latter Hazard development utilizes 100 percent of the rope strength with the wire ends permanently secured under steel collars. Not one minor accident has occurred as the result of these safety precautions.

★ ★ ★

The completed tower, which is exactly 100 feet higher than New York's Empire State Building, is 12 feet on a side up to the 1420-foot level where it tapers in to the base of the antenna. It rests on a base insulator made up of 21 four-inch diameter porcelain tubes. The insulator is designed to withstand a crushing load of 11,200,000 pounds with an estimated maximum working load of 2,800,000 pounds.

The Ford Plant Tour

On Thursday afternoon, November 11th, those taking the tours will arrive at the **Ford Rotunda Building** at approximately 2:00 P. M.

★ ★ ★

Guides will conduct groups first on a trip through the Rotunda Building, after which they will proceed in cars about the Rouge Plant to get a comprehensive idea of the huge operation.

★ ★ ★

The group will then visit the steel mill, the rolling mill, the press shop and, finally, the Ford assembly line in Dearborn.

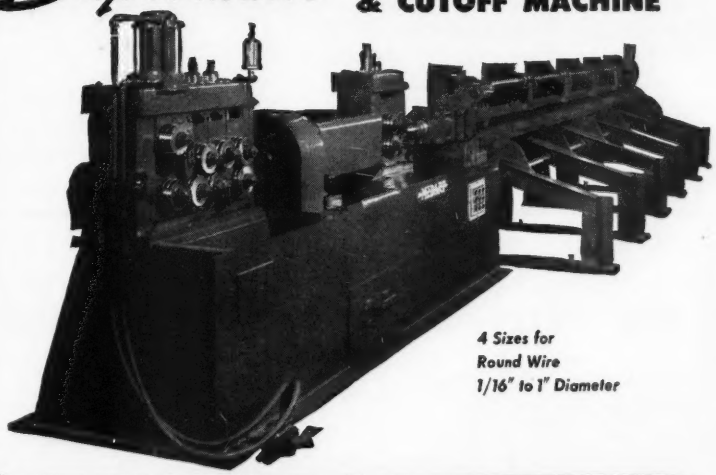
★ ★ ★

Visitors must depart from the Ford Motor Company's properties at 4:00 P.M. and the careful cooperation of all their Wire Association guests in this regard will be appreciated.

Fully Automatic Round Wire Straightened At Speeds Of 200 FPM!

MEDART

Supermatic WIRE STRAIGHTENING & CUTOFF MACHINE



4 Sizes for Round Wire 1/16" to 1" Diameter

- A complete departure from conventional machines. More compact and accurate, with throughput speeds to 200 f.p.m. depending upon size and type of material.
- Fully automatic feed-through, straightening and cutoff, without attention from operator, after end of coil is started through pinch rolls.
- All swelling or expansion of workpiece is prevented by new HYDRA-ELECTRIC AUTOMATIC CUTOFF. Electronic self-actuating shear eliminates all mechanical operating parts beyond Cutoff. Makes up to 60 cuts per minute.
- Exclusive ROTO-DIE SPINNER is equipped with cylindrical straightening dies mounted in anti-friction bearing, instead of ordinary cast iron shoe-type dies. Virtually all friction, heat and rapid die wear are prevented. Protects against changes in physical characteristics and surface of wire.
- Automatic scale removal from hot-rolled stock.
- Rugged construction. Timken bearings throughout. Ground and polished Smavroc steel rolls. All mechanism completely accessible for maintenance.

Write For Brochure

Supermatic 2-plane models for shaped wire also available

THE MEDART COMPANY 3535 DE KALB STREET ST. LOUIS 18, MO.

Outstanding Personalities of the Wire Industry

Consultant Nominated as Director of ASME

Harold C. R. Carlson, who heads **The Carlson Company** in New York, a firm of consulting engineers, has been nominated for a four-year term as Director-at-Large for the American Society of Mechanical Engineers.

★ ★ ★

The firm's work covers industrial management, machine design, plant layout, production methods and similar projects. They specialize in work for the spring manufacturing and wire forming industries and Mr. Carlson holds patents on spring patents, spring coilers, torque-testing instruments and other products. He is a graduate of Pratt Institute and completed additional courses at Polytechnic Institute of Brooklyn and Columbia University.

★ ★ ★

He is the author of a dozen or so technical papers and editor of the Spring Design Section of the Tool Engineer's Handbook. His office is at 277 Broadway, New York, N. Y.

Norton Personnel Announcements

Norton Company of Worcester, Mass., has announced several changes among its outside sales personnel effective September 1st. **Charles M. Wellons,** formerly a field engineer at the Philadelphia district office, has been named an abrasive engineer and will be responsible for the Philadelphia territory formerly handled by the late **A. Watson Gough.**

★ ★ ★

Robert C. Divoll, formerly a field engineer in Pittsburgh, has been appointed an abrasive engineer responsible for part of the Pittsburgh territory. **Charles R. Garfield,** a recent graduate of the Norton Sales Training course, has been appointed a field engineer at the Pittsburgh District Office.

★ ★ ★

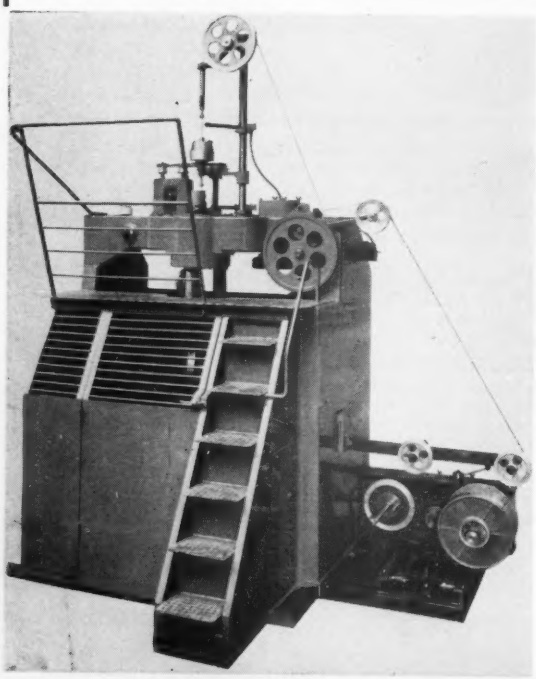
William J. Mahan has been named field engineer for Abrasive Grain applications in New England (except for Connecticut), and upper New York State. **Joseph F. Hartl,** formerly abrasive grain engineer for all of New England and upper New York State, has been appointed sales engineer, abrasive grain, for the State of Connecticut.

Named Manager G.E. Wire and Cable Unit

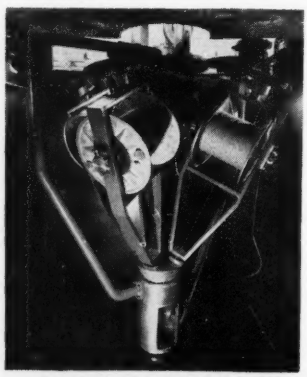
Henry C. VanZandt of Easton, manager of **General Electric Company's** Construction Material's division's wire device operations, has been named manager of G. E.'s

A New Machine . . .

THE POURTIER QUADDING MACHINE WITH HALF A DETORSION



- Automatic stop motion in case of breakage of paper or cotton, on a predeterminated length
- Compensator device controlling the unrolling of the feed-drums and the equality of tension of the four ends
- Double take-up: compensator motion controlling the tension of the quad. Transversal movement of the reels instead of traverse
- 2 lays per rotation of the flyer
- Special balancing capacity device
- Lays easy to reverse and to adjust
- Lockheed braked
- Automatic central lubrication
- Able to be used as a twinner
- Production: 500 lays per minute
- Feed-drums: maximum 16" (torsion) 14" (detorsion)
- Take-up reels: Maximum 18"
- Lays: from 1 to 7 lays per foot



Detail of Rapid Flyer

POURTIER MACHINES

153, rue Gallieni, ROMAINVILLE (Seine) FRANCE

wire and cable plant at Lowell, Mass. Mr. VanZandt's appointment was made public by **Edgar A. Reiss,** manager of manufacturing for the wire and cable department.

★ ★ ★

Mr. VanZandt, a native of Plainfield, N. J., has been associated with the Bridgeport plant of General Electric since 1934. He was named manager of the former appliance and merchandise procedures department in December, 1944, and was transferred to the company's management research department at Princeton, N. J., in January, 1947. He returned to Bridgeport in June, 1948, becoming staff assistant to the vice president and general manager of the Construction Materials division. He was appointed manager of the Bridgeport operations of the wiring device department in April, 1953.

Vaughn Machinery Promotions

The Vaughn Machinery Company of Cuyahoga Falls, Ohio, has recently announced the selection of **Maurice A. Nye** as Chief Engineer. He has been Assistant Chief Engineer since 1950 and has been associated with the Engineering Department since 1927.

★ ★ ★

James E. Spearman has been named Assistant to the President of the Company. A graduate of University School in Cleveland, he attended Yale University. He joined the company in 1940. After entering the army in 1942 and serving in the Engineering Corps throughout the war, he returned to the company in late 1945 to the Sales Department.

★ ★ ★

Dale R. Knouse, for over twenty years in the Engineering Department of **Aluminum Company of America,** has joined the Sales Engineering staff of The Vaughn Machinery Company, manufacturers of wire drawing equipment. Mr. Knouse is a mechanical engineer and graduated from Carnegie Tech in 1932.

Carboloy Adds Man in Chicago

Michael D. Barnett has joined **Carboloy Department of General Electric Company,** Detroit, as a sales representative for the midwestern district. He will reside in the Chicago area.

★ ★ ★

Mr. Barnett joined General Electric Company in 1951, and has worked in both engineering and marketing. A graduate of Yale University with a B.S. degree in economics, he received his M.S. degree from Columbia University in marketing in June, 1951.

Auto-Lite Promotes Kennedy

Frank J. Kennedy, Vice President and Secretary of **The Electric Auto-Lite Company,** has been made Administrative Assistant to the President, according to an announcement made by **James P. Falvey,** President of the company.

★ ★ ★

NESOR ALLOY PRODUCTS CO.

MANUFACTURERS OF WIRE STRIP BRAID • STRAND

282 HALSEY STREET NEWARK, N. J.

FINE WIRE

TO .001

IN THE FOLLOWING METALS AND ALLOYS

ALUMINUM- AND ALLOYS	MONEL-NICKEL	COPPERCOATED STEEL
BARE AND TINNED COPPER	STAINLESS STEEL	SILVER PLATED COPPER
LEAD AND SOLDER ALLOYS	STEEL-LOW AND HIGH CARBON	BRASS AND ALLOYS
PRECIOUS METALS	RESISTANCE WIRE	PHOSPHOR BRONZE

Exacting size tolerances—uniformity of tempers, a good product and prompt service. A dependable supplier soliciting your business.

Consultation—Samples and Quotations Without Obligation.

Mr. Kennedy, who attended Fordham University, joined the Moto-Meter Company, Inc., of New York City in 1921 and was named auditor of the firm in 1929. When Moto-Meter merged with Auto-Lite in 1934, Mr. Kennedy came to Toledo as auditor of the expanded company. He was named Secretary of Auto-Lite in 1944 and became a Vice President in 1953.

Made Chief Engineer of Union Drawn Steel

Walter L. Brough, Jr. has been appointed chief engineer of **Republic Steel Corporation's Union Drawn Steel Division, D. D. Buchanan,** manager of operations, announced recently.

★ ★ ★

He succeeds **Alex Carnie,** who has been transferred to Republic's Truscon division in Youngstown. Mr. Carnie was associated with Truscon for 18 years before joining Union Drawn in 1945.

★ ★ ★

In his new position Mr. Brough will supervise engineering activity at Union Drawn plants in Massillon, Beaver Falls, Pa., East Hartford, Conn., Gary, Ind., Los Angeles, Calif. and at Republic subsidiary in Hamilton, Ontario, **Union Drawn Steel Co., Ltd.**

★ ★ ★

He graduated from Fenn College, Cleveland, with a degree in mechanical engineering, attended Harvard University Graduate School of Business Administration and served as a Navy officer during both World War II and the Korean hostilities.

★ ★ ★

Mr. Brough had been associated with the **Timken Roller Bearing Co.,** Canton, Ohio, since 1937 in engineering and production capacities.

Progress Report on Catalytic Combustion

IN THE

WIRE INDUSTRY

Five years of Pioneering and Development in Fume Disposal for the Wire Industry — Now brings to you:—

1. The complete and dependable Elimination of Fumes needed for Modern Wire Enameling operations, also elimination of personnel and neighborhood fume complaints.
2. Elimination of condensate problems with consequent reduction in maintenance, fire hazard, and periodic shut downs for cleaning.
3. Continuous monitoring of oven solvent loads, to assure safe, as well as economical oven operation.
4. Standard design Catalytic disposal systems for most horizontal and vertical ovens with proven service-free catalyst performance exceeding 20,000 operating hours.
5. The experience and proven performance resulting from some 200 installations in the wire enameling field and several hundred related installations in other fields of service.
6. Complete fume disposal systems also available for resin and varnish cooking, coil baking, black japanning and similar operations involving the liberation of organic vapors.

We welcome your visit or call to our Detroit office while attending the convention. Phone TEmple 2-2710.

Patents Pending and Granted

Catalytic *Fume Incineration for Industry*

COMBUSTION CORPORATION

4540 GRAND RIVER AVENUE DETROIT 8, MICHIGAN

Rem-Cru Elects Officers

Walter E. Gregg has been appointed vice-president and assistant general manager of **Rem-Cru Titanium, Inc.,** Midland, Pa.; **Dr. Walter L. Finlay** was appointed vice-president and manager of research; and **John M. Dempsey** has become assistant secretary.

Advanced by Anaconda W&C

William O. Riley, formerly assistant superintendent of the Anderson, Ind. mill of Anaconda Wire & Cable Co., has been promoted to the position of superintendent of the newly expanded Anaconda mill at Orange, Cal.

★ ★ ★

Charles M. Thomas has been named to succeed Mr. Riley as assistant superintendent of the mill at Anderson. **Ray Clevenger** has been promoted to Mr. Thomas' former post of technical supervisor, and **Carl Eckstein** has been named assistant head inspector succeeding Mr. Clevenger at Anderson. **Charles W. England** is head inspector.

★ ★ ★

Mr. Riley joined Anaconda Wire & Cable Co. as engineer in 1947 and was assigned to the Hastings mill. In 1948, he was made time study supervisor at the Muskegon, Mich. mill, a post he held until 1950, when he was made personnel

manager. He became assistant superintendent at the Anderson mill in 1952.

★ ★ ★

Mr. Thomas joined the Anderson mill of the company in 1931, also as engineer. In 1946, he was named to assist in technical supervision, and industrial engineering. A year later, he was named technical supervisor, a position he held until his present promotion.

★ ★ ★

Mr. Clevenger had been assistant head inspector at the Anderson mill. He joined Anaconda in 1930 as inspector, was appointed subforeman of the fabric wrapping department in 1938 and in 1945 was named assistant head inspector and laboratory supervisor.

★ ★ ★

Mr. Eckstein has been with Anaconda since June, 1923.

Reassignment of Owens-Corning Executives

Reassignment of three executives of **Owens-Corning Fiberglas Corporation** has been announced by President **Harold Boeschenstein.**

★ ★ ★

Marshall D. Burch, manager of the company's Kansas City, Kan. plant, is appointed director of industrial and personnel relations; **Fred R. Coumbe,** manager of the Newark, Ohio, plant, succeeds Mr. Burch at Kansas City and **Howard B. Richter,** cost control manager of the firm's General Products Division, becomes Newark plant manager.

★ ★ ★

Manager of the Kansas City plant since 1948, Mr. Burch has been with Owens-Corning since 1940. He had successively been service manager at the Newark plant, superintendent of the company's textile operations there and manager of the firm's Huntingdon, Pa., textile plant. He will now be at Toledo in the general offices.

★ ★ ★

Mr. Coumbe joined Owens-Corning in 1939 after several years' experience in the engineering department of the Corning Glass Works, Corning, N. Y. In 1942, he was appointed production manager for all Fiberglas wool and textile operations in Newark and four years later was named plant manager.

★ ★ ★

Mr. Richter has been with Owens-Corning since 1941. His first two years were spent at the Newark plant where he served successively as internal auditor and general accounting supervisor. For four years he was comptroller at the company's Ashton, R. I. plant and since 1949 had been cost control manager for the General Products Division.

Correction

On page 864 of our August issue the name of Firth-Sterling, Inc. was inadvertently omitted from the list of donors of door prizes. Wade Davis, manager of Los Angeles branch, contributed three of the prizes. For their kindness we are grateful and hasten to apologize to Mr. Davis and his company for the omission.

WIRE INSULATING MACHINERY

EFFICIENT MODERN SYSTEMS FOR:

CABLE LACQUERING

WIRE ENAMELING

NYLON AND TEFLON COATINGS

PLASTISOL SOLUTIONS

PLASTIC AND RUBBER EXTRUSION

GLASS AND VARNISH INSULATION

ASBESTOS INSULATION

SATURATING AND FINISHING

CONTINUOUS LET-OFFS & TAKE-UPS

SPECIAL PROCESS MACHINERY

C. A. LITZLER CO., INC.

11621 DETROIT AVE., CLEVELAND 2, OHIO

Inco Development and Research Division Appointments Announced

The establishment of four new sections and other changes in the Development and Research Division of **The International Nickel Company, Inc.,** have been announced by **F. L. LaQue,** Vice-President and Manager of the Division.

★ ★ ★

The new sections are: Constructional Alloy Steels Section, with **H. V. Beasley** in charge; Electroplating Section, with **Clarence H. Sample** in charge; Inco Nickel Alloys Development Section, with **T. E. Kihlgren** in charge; and Stainless Steel and Heat-Resistant Alloys Section, with **Dr. V. N. Krivobok** in charge.

★ ★ ★

W. Z. Friend has been appointed to succeed Mr. LaQue in charge of the Corrosion Engineering Section; **Dr. T. P. May** and **H. T. Paterson** have been appointed Technical Manager and Operational Manager, respectively, of the "Kure Beach" Corrosion Testing Station near Wilmington, North Carolina; and **W. H. Sparr, Jr.,** has been appointed to succeed Mr. Beasley in charge of the Technical Field Section in Pittsburgh, Pennsylvania.

Thermoplastic Cable Sheathing Kraft

the patented paper used in

NONMETALLIC SHEATHED CABLE

Is highly water repellent.
Available in all weights
both creped and flat.

Merrimac Paper Co., Inc.

Mills — Lawrence, Mass.
295 Madison Ave., New York City

Also manufacturers of many tailor-made
Varnishing, Saturating, Tubewinding
and Insulating Papers

Continental Establishes New Department Headed by Smith

Continental Steel Corporation, Kokomo, Indiana, has announced the promotion of **Byron L. Smith** to the position as manager of a newly established Market Development Department. Mr. Smith, who for the past five years has been District Sales Manager in Kansas City, Missouri, started with Continental in 1935, serving in various capacities in sales and sales promotion, including actual field work as a sales representative in Indiana, Illinois, and Oklahoma. He is thoroughly experienced in the sale of all products manufactured by Continental. Mr. Smith has been transferred to Kokomo and assumed his new duties September 1.

Chairman of AIEE's Planning & Coordination Committee

New Chairman of the important Committee on Planning & Coordination of the American Institute of Electrical Engineers is **L. F. Hickernell,** chief engineer of **Anaconda Wire & Cable Co.,** Hastings-on-Hudson, N. Y. Mr. Hickernell was appointed by **A. C. Monteith,** president of the Institute and vice president, **Westinghouse Electric Corp.,** Pittsburgh.

★ ★ ★

Mr. Hickernell recently was re-elected a director of the Institute and, for several years he was Chairman of the Committee on Technical Operations.

★ ★ ★

He has been Anaconda's Chief Engineer since 1933.

Scovill Moves Los Angeles Warehouse to New and Larger Quarters

Scovill Manufacturing Co. has moved its Los Angeles warehouse and sales offices to new and larger quarters at 6464 East Flotilla St., Los Angeles, Cal., from 2627 South

Soto as announced by **Kenneth M. Reid,** District Manager. The move was made October 1st.

★ ★ ★

This move is necessary to provide additional space to maintain warehouse stocks for the Los Angeles and Pacific Coast areas. Items stocked include brass and aluminum mill products, lawn and garden sprinklers, drug and cosmetic containers, zippers, buttons, snap fasteners, and other apparel closures, aircraft and industrial fasteners, plumbing goods and automotive products.

★ ★ ★

The new warehouse, under the resident supervision of **Walter R. Allen,** will serve as headquarters for the mill and manufacturing sales departments of the main plant in Waterbury; Waterville Division at Waterville, Conn. and A. Schrader's Son Division of Brooklyn, N. Y.

★ ★ ★

Scovill is America's oldest brass firm being established in 1802 in Waterbury, Conn. It has had a Los Angeles office for the past 29 years.

Named General Sales Head, Republic Round Chain

William C. Schnackel has been appointed general manager of sales of **Republic Steel Corporation's Round Chain Division,** Cleveland, Ohio, **Norman W. Foy,** vice president in charge of sales, announced recently.

★ ★ ★

The division includes the plants and business of the **Cleveland Chain & Manufacturing Company** and its affiliated companies. These plants, which are known as the Round Chain organization, were acquired by Republic recently.

★ ★ ★

Plants are in Cleveland, Bridgeport, Conn.; Trenton, N. J.; Seattle, Wash.; and San Francisco, Calif. The division has warehouses in Los Angeles, Calif.; Chicago, Ill.; Birmingham, Ala.; Portland, Ore.; St. Louis and Kansas City, Mo.

★ ★ ★

Products of Republic's Round Chain division are sold in all 48 states and in more than 25 foreign countries. With one of the most complete lines in the chain industry, the division is a major supplier to a wide variety of industries.

★ ★ ★

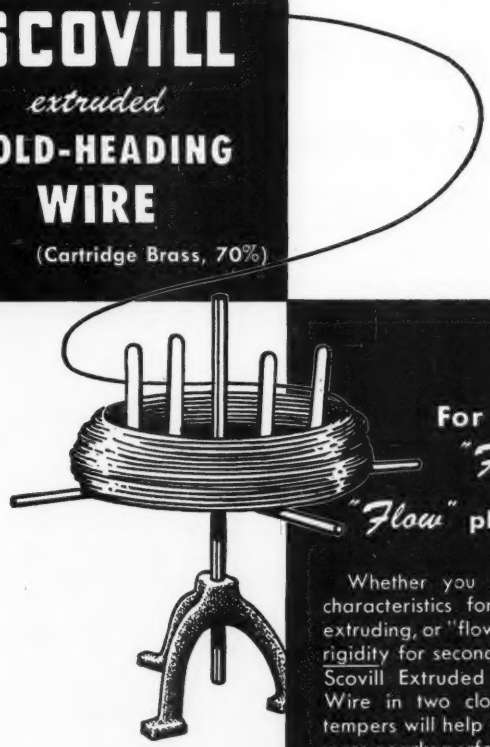
Mr. Schnackel, who has been connected with Republic's New York district sales office for the last seven years, will make his headquarters in Cleveland.

★ ★ ★

A graduate of Western Reserve University, Cleveland, he joined Republic in 1942 in the metallurgical department at the Cleveland steel plant. In 1945 he was appointed an analyst in the commercial research division and in 1947 was assigned to New York as a sales representative.

TO SELL—ADVERTISE IN WIRE AND WIRE PRODUCTS
It pays—send for rates
453 Main St., Stamford, Conn.

SCOVILL
extruded
COLD-HEADING WIRE
(Cartridge Brass, 70%)



For *"Flow"* or *"Flow"* plus RIGIDITY

Whether you require "flow" characteristics for heading and extruding, or "flow" plus essential rigidity for secondary machining, Scovill Extruded Cold-Heading Wire in two closely controlled tempers will help you to produce more nearly perfect cold-headed brass parts.

Because of its higher copper content and production by the Hot Extrusion process from uniformly sound Continuous-Cast billets, Scovill Extruded Cold-Heading Wire virtually eliminates such defects (attributed to wire) as split heads or shanks, "out-of-round" heads, inadequate filling out of heads and shoulders, and rough "orange peel" effect. These are differences in quality you can SELL . . . Let us help you specify the proper temper for your own operations.

You Can SELL the Difference

SCOVILL MANUFACTURING COMPANY
Mill Products Division
99 MILL STREET • WATERBURY 20, CONNECTICUT
Phone Plaza 4-1171

22SC54B

Talon Head Elected President of Lightning Fastener Co.

Lewis Walker, president of **Talon, Inc.,** Meadville, Pa., has been elected president of **Lightning Fastener Company, Ltd.,** St. Catharines, Ont., succeeding the late **Dr. Gideon Sundback** who was president and chief engineer of the company from the time he founded it in 1925.

* * *

Elected vice president was **J. C. Klingener,** closely identified with Dr. Sundback in his work both in Canada and the United States. Mr. Klingener was also elected to fill the vacancy existing on the board of directors of Talon, Inc.

* * *

Gunnar Falk has been named chief engineer. Mr. Falk was closely associated with Dr. Sundback for nearly 30 years in various engineering capacities and as chief engineer will be directly responsible for all phases of Lightning's experimental and engineering problems.

* * *

Other Lightning officers are **David G. Rae,** vice president and general manager and **Frank E. Poynton,** secretary-treasurer.

ATTENTION: Manufacturers of Non-Metallic Sheath Cable

WHY USE ASPHALT?

Carbro offers you a much
Cleaner, Better, Finish
without that tell-tale black asphalt mark.

Investigate our

New Thermoplastic Hot-Melt Finish

NON-TOXIC—FLAME-PROOF—MOISTURE-RESISTANT
ELIMINATES THAT TELL-TALE "BLACK MARK"

SEND FOR DETAILS OF "NEW CABLE FINISH"

P.S. Good for S. E. Cables, too.

CARBRO CHEMICAL CO.
PAWTUCKET, RHODE ISLAND

Manufacturers of Flame-proof Saturants, Wire Paints and Lacquer in all Nemo Colors, for all types of Insulated Copper Wire

Made General Superintendent of Canada Wire and Cable

The appointment of **D. S. Grant** as General Superintendent, Main Plant, Toronto (Leaside), has been announced by **F. A. Pankhurst,** General Works Manager, **Canada Wire and Cable Company, Limited.**

* * *

Mr. Grant, who has been associated with the Company since 1939 was responsible as Equipment Superintendent for the co-ordination of construction and installation of equipment during the Company's expansion programme over the past three years.

D. S. Grant

Veteran Norton Man Retires

John Cook, grinding department foreman, retired today after 43 years with **Norton Company.** Mr. Cook is well-known at plants throughout the country for his ability at diagnosing grinding problems and through his contribution of articles on better grinding in "Grits and Grinds," Norton's monthly magazine.

* * *

For many years, Mr. Cook was a demonstrator and salesman of Norton machines. At one time he served as District Manager in the Philadelphia and Syracuse areas. When distributor selling replaced direct selling in those areas, he was returned to Worcester where his years of experience were ap-

plied to turning out top quality grinding in Norton's own plant.

★ ★ ★

Stewart O. Bailey has been named to succeed Mr. Cook. He joined Norton in 1937 as an apprentice and has served as a grinder operator, grinding instructor, assistant foreman and acting general foreman prior to his present appointment.

Federated Appoints Technical Sales Engineer

Federated Metals Division, American Smelting and Refining Company, 120 Broadway, New York City, has announced the appointment of **Theodore H. Heemstra** as a Technical Sales Engineer in the Eastern Sales Department. Mr. Heemstra will concentrate his activities on solders and other metals in the electrical and electronic industries.

★ ★ ★

Mr. Heemstra has been with Federated Metals since 1948. He has served in both the production and research departments. He attended Purdue University, and was graduated with a B.S. in Metallurgical Engineering in 1948.

Carboloy Appoints Superintendent of Fabricating

E. C. Graves, superintendent of fabricating, Carboloy Department of General Electric Company, Detroit 32, Mich., has been named superintendent of product manufacturing.

★ ★ ★

Mr. Graves will be responsible for all product manufacturing activities in the Detroit plant of the Department.

★ ★ ★

Before joining Carboloy Department in 1934, he was associated with **Ford Motor Co.,** and **Ligon Bros. Tool & Die Co.,** Detroit.

Victor F. Rea

It is with regret that we announce the death of **Victor F. Rea,** founder and president of the **Rea Magnet Wire Company** of Fort Wayne, Ind. Mr. Rea died at his summer home on Lake Leelanau, Michigan, on August 21, 1954.

Appointed Marketing Director of Spring Company

N. D. Ely, president of **L. A. Young Spring & Wire Corporation,** Detroit, Mich., has announced that **Russell B. Robins** has been named to the newly created post of director of marketing and merchandising for the corporation. Mr. Ely explained that the new post had been established as a result of the company's decision to further diversify its products.

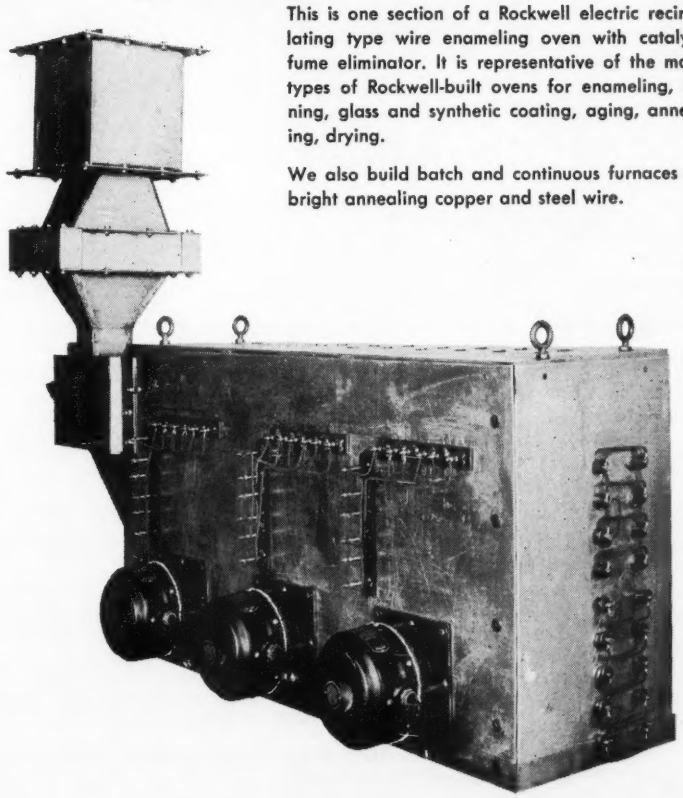
★ ★ ★

Mr. Robins formerly was assistant general sales manager of the Tractor & Implement division of Ford Motor Company.

Alcoa Shifts Two Engineers

Joel Thompkins has been transferred to the Central Electrical Engineering Dept., Pittsburgh, of the **Aluminum Company of America** and **Hazen E. House,** becomes chief of the Electrical Div., Aluminum Research Laboratories at Massena, N. Y.

Complete Wire Enameling and Processing Equipment from Unwinders to Rewinders



This is one section of a Rockwell electric recirculating type wire enameling oven with catalytic fume eliminator. It is representative of the many types of Rockwell-built ovens for enameling, tinning, glass and synthetic coating, aging, annealing, drying.

We also build batch and continuous furnaces for bright annealing copper and steel wire.

ROCKWELL SINCE 1888 BUILT

W. S. ROCKWELL COMPANY

FURNACES • OVENS • BURNERS • VALVES • SPECIAL MACHINERY

2424 ELIOT STREET • FAIRFIELD, CONN.

Sales Representatives in Principal Cities

Harold L. Trembicki

Harold L. Trembicki, a well-known figure in wire circles, died on September 1, 1954 after a long illness. He was the founder and president of **The Trembicki Company,** Chicago.

★ ★ ★

Mr. Trembicki will be remembered for his indefatigable work in the development and promotion of wire coatings, on which he was considered an authority.

Engineer Joins Mattatuck

The appointment of **Andrew G. Farkas** as product engineer of the **Mattatuck Manufacturing Company,** Waterbury, Conn., has been announced by **Stuart E. Judd,** president. He will collaborate with **Ervin E. Schiesel,** technical director of the company, in future product development and improvement.

★ ★ ★

Mr. Farkas was formerly associated with the Defence Contracts division of Bigelow-Sanford Carpet Company, Thompsonville. He is a registered professional engineer of Connecticut. He received his engineering degree at the College of the City of New York. He has had 12 years of experience in the engineering design field.

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NEW TYPE

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	CHARACTERISTICS	TYPICAL APPLICATIONS
TEFLON Coated Fiberglass	+250°C to —100°C operating temperature. Excellent dielectric strength. High flame and moisture resistance. Good abrasion resistance. Stable standard and special colors.	Magnet Wire—High Temperature Lead Wire—Fire Wall Wire — Coaxial Cable — High Temperature Heater Cord Braid
SILICONE Coated Fiberglass	+400°C to —40°C operating temperature. Very good dielectric strength. Good moisture resistance. Fair abrasion resistance. Stable colors.	Braid for High Temperature Appliance and Hook-up Wire — Multi-conductor cable — Magnet Wire
VINYL Coated Fiberglass	+90°C to —10°C operating temperature. Good dielectric strength. Good moisture and flame resistance. Excellent abrasion resistance. Brilliant colors, excellent light and heat stability.	Heater Cord (Type HPD) — Appearance Braid—Pull Down Fixture Wire
LATEX Coated Fiberglass	High moisture and abrasion resistance.	Strength Members in Multi-conductor Cable
NYLON Coated Fiberglass	High moisture and abrasion resistance. Excellent color stability.	Appearance Braid for Multi-conductor Communication Cable

Colors available in all types of coating. Complete range of counts from 75-1/0 to 900-1/0 available on braider cops or multi-end serving packages.
Contact our Development and Application Laboratory for samples suited to your specific requirements.

CUSTOM COATERS OF NATURAL AND SYNTHETIC YARNS

Chemo-Textiles
INCORPORATED
WEST WARWICK • R. I.

Named Marketing Director, L. A. Young Spring

Russell B. Robins has been appointed director of marketing and merchandising of the **L. A. Young Spring & Wire Corporation,** Detroit, according to **N. D. Ely,** president.

★ ★ ★

The establishment of this new post is in line with the corporation's policy of further diversification of products.

★ ★ ★

Mr. Robins comes to L. A. Young from the Tractor & Implement Division of Ford Motor Company where he served as assistant general sales manager.

Lignum-Vitae to be Represented at Convention

The Lignum-Vitae Products Corp., 96-100 Boyd Avenue, Jersey City 4, N. J. will be in attendance at the Convention with samples of Lignum-Vitae, the hardest and densest of woods, that has the unusual property of being impregnated by nature with an oil that supplies excellent lubricating properties.

★ ★ ★

The wood is being successfully used in many applications in the wire industry for wire guides, bushings, bearings, steady rests, etc., and is said to be economical, long wearing and highly satisfactory in these uses.

★ ★ ★

Sam E. Gold, Secretary and Sales Manager of the company will be present for consultation and to explain the advantages of the material, to show samples and to arrange to send finished samples for testing to those who may be interested.

Establishes Hydraulic Equipment Department

The Sutton Engineering Company of Bellefonte, Pa., has announced the formation of a new division, the Hydraulic Equipment Department, which will specialize in the manufacture of extrusion presses and auxiliary hydraulic equipment for the steel and nonferrous metal industries.

★ ★ ★

The company, which has long made straightening and cutting machines for heavy stock and wire, is headed by **John B. Sutton, Jr.,** President. **Walter F. Larson** has been appointed Chief Engineer and **Donald E. Russell** will be the Sales Manager of the new department.

Named Quality Control Engineer by Carboloy

Robert A. Canning, formerly manager of production engineering, **Carboloy Department of General Electric Company,** has been named manager of quality control.

★ ★ ★

Mr. Canning will be responsible for all quality control and inspection activities carried on in both the Detroit and Edmore, Mich., plants of the Department.

★ ★ ★

Previous to joining Carboloy Department in 1946, Canning was affiliated with **American Steel and Wire Co.,** Worcester, Mass., **A. F. Holden Co.,** New Haven, Conn., and **Acme Heat Treating Co.,** Worcester, Mass. He is a graduate of M.I.T. with a B.S. degree in electrochemical engineering.

Engineer Joins Davis-Standard

Davis-Standard Sales Corp., Mystic, Connecticut, announces the addition of **Frank Johnson** to its engineering staff. Mr. Johnson, a graduate of Wentworth Institute in Boston, has done testing work for **General Electric Company,** in Pittsfield, Mass., and was for nine years a designer of wire machinery for **James L. Entwistle Company.** It is expected that the design experience Mr. Johnson brings to Davis-Standard will contribute to the program now under way aiming at expansion and improvement of the line of Davis-Standard machinery for the electrical wire and cable industry.

Kaiser Appoints Distributor

Kaiser Aluminum & Chemical Sales, Inc., Oakland, Calif., has appointed **American Brass & Copper Co.** as a distributor of its line of aluminum rod, bar, sheet products and extrusions.

Republic Appointments

Peter Robertson has been named vice president in charge of planning and development of **Republic Steel Corp.,** Cleveland, to succeed **E. M. Richards,** retiring. **Charles P. McCabe,** formerly manager of Republic's Bolt & Nut Division, has succeeded Mr. Robertson as assistant vice president in charge of operations of manufacturing plants. **John Dunlop** has been appointed to replace Mr. McCabe.

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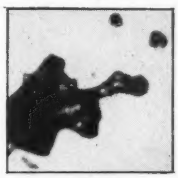
. . . but fines cost the most. DIADUST* *quality* is worth paying for, but fine particles mixed with any given size, go along just for the ride and do no work.



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6-12 Micron
Magnification
1000 X

DIADUST, made by a special process, gives you *quality* without the unwanted fines. Every particle of DIADUST carries its own share of the work load.

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A Review of Recent Wire Patents

No. 2,685,123, WIRE BURNISHER, patented August 3, 1954 by Richard H. Burns, Muncie, Ind., assignor to Indiana Steel & Wire Company, Muncie, Ind., a corporation of Indiana.

Helical springs, forced down by centrifugal force upon the moving wire which passes through them, are employed in this burnisher.

★ ★ ★

No. 2,685,362, STRAND FEEDING APPARATUS, patented August 3, 1954 by Einer W. Larsen, Elmhurst, Ill., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

The apparatus includes a capstan having strand engaging surfaces for progressively gripping and releasing successive portions of a wire strand, drive means for continuously rotating the capstan for withdrawing a predetermined length of the strand from a supply and forming a slack in advance of the capstan.

★ ★ ★

No. 2,685,547, PLATINUM CATALYSTS, patented August 3, 1954 by Hermann Holzmann and Gerhard Reinacher, Hanau (Main), Germany, assignors to Deutsche Gold-und Silber-Schneideanstalt vormals Roessier, Frankfurt am Main, Germany, a corporation of Germany.

A woven platinum wire network suitable for high temperature catalytic reactions is disclosed, the wires of which are composed of crystals having a cross-section transverse to the longitudinal axis of the wires identical with the transverse cross-section of the wires and whose size in the direction of the longitudinal axis of the wires is a multiple of the diameter of the wires.

★ ★ ★

No. 2,685,697, HEAD SLOTTING MACHINE, patented August 10, 1954 by William Stern, Park Ridge, Ill., assignor to Illinois Tool Works, Chicago, Ill., a corporation of Illinois.

A nicker for the heads of screws is disclosed. There is but one relatively long claim.

★ ★ ★

No. 2,685,698, SCREW OR LIKE NICKING MACHINE, patented August 10, 1954 by Victor Hill Fray, Auckland, New Zealand.

There are sixteen claims to this nicking machine, which includes a rotary work holder.

★ ★ ★

No. 2,685,699, SHOE TREE, patented August 10, 1954 by Charles T. Norton, Jr., Anderson, Inc.

The shoe tree is constructed of a single length of wire bent to form a shoe-receiving head and a support for the head, which support may be secured to a wall or the like.

★ ★ ★

No. 2,685,961, APPARATUS FOR DRAWING STOCK, patented August 10, 1954 by Otto R. Schuler, Detroit, Mich., assignor to Calumet & Hecla, Inc., a corporation of Michigan.

This patent relates to tongs for drawing apparatus. Four claims.

★ ★ ★

No. 2,686,349, MANUFACTURE OF WIRE-SHAPED COMPONENT MEMBERS PROVIDED WITH ONE OR MORE STRIPS OF TAPE-MATERIAL, patented August 17, 1954 by Johannes Mijboer, Eidhoven, Netherlands, assignor to Hartford National Bank and Trust Company, Hartford, Conn., as trustee; patent dedicated to the public insofar as it relates to lamps and lamp parts to the extent stated in document recorded in the United States Patent Office, April 13, 1954.

A method of making wire filaments is disclosed in which a tape is crimped to the wire, the latter severed and the tape, carrying the severed wire, is transported to a point remote from the crimping station and a desired length of the tape then cut off.

★ ★ ★

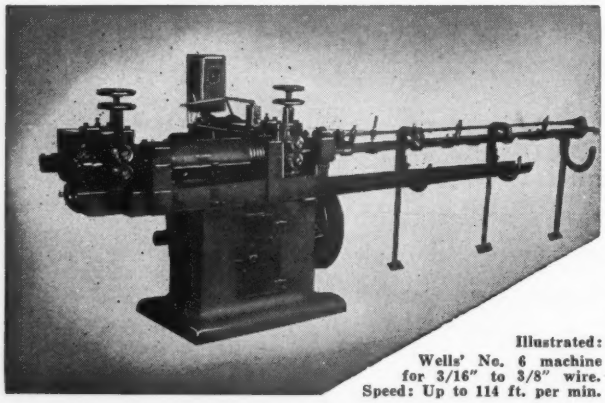
No. 2,686,355, PROCESS FOR COATING METALS WITH ALUMINUM, patented August 17, 1954 by Harald Lundin, North Bergen, N. J.; Helen Marie Lundin, executrix of said Harald Lundin, deceased.

The method of forming a continuous tightly adherent coating of aluminum on

What do you want in your

STRAIGHTENER and CUTTER?

- **DEPENDABILITY?** **WELLS machines provide day-in, day-out continuous operating service.**
- **SPEED?** **These automatic rotary machines will not only give you speed, but accuracy as well.**



Illustrated: Wells' No. 6 machine for 3/16" to 3/8" wire. Speed: Up to 114 ft. per min.

Cuts wire in any length from 7½" up to 25'. Special attachment furnished on order for long lengths. Straightener flier runs in ball bearings. Gear drive and motor enclosed in base. Door provides accessibility.

58 years of experience and continuous engineering, with use of finest materials, have put WELLS machines in a class by themselves for excellence of performance. Built to handle the toughest jobs, year after year, with little or no servicing. Supplied in a complete range of sizes.

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Builders of Fine Wire Working Machinery

a base metal such as iron is disclosed and comprises thoroughly cleaning the surface of the iron, then applying to such cleaned surface an effective amount of a flux selected from the group consisting of fluoride compounds of zirconium and fluoride compounds of titanium, and then contacting such surface of the iron with molten aluminum.

★ ★ ★

No. 2,686,369, WIRE DIE GAUGE, patented August 17, 1954 by Michael Ongert, Garfield Heights, Ohio.

There are two claims to this gauge. Included are rigid and a sliding cross-heads with the sliding cross-head movable relative to the other and a pair of gauging members at least one of which has the form of a truncated cone adjustably mounted on the cross-heads in opposition in a common vertical plane, these members being adapted to cooperate to gauge a die placed therebetween, the other one of the members having an end portion shaped and dimensioned to fit snugly into the angle on one side of the bearing in the die.

★ ★ ★

No. 2,686,598, COLLAPSIBLE DISH DRAINER, patented August 17, 1954 by Albert L. Brecht, Philadelphia, Pa.

This device is constructed of wire and comprises inner and outer wire frames.

★ ★ ★

No. 2,686,739, INSULATED ELECTRICAL CONDUCTOR AND METHOD OF PRODUCING SAME, patented August 17, 1954 by Charles F. Kohl, Jr., Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich., a corporation of Michigan.

A method of preparing an electrical conductor for use in electrical equipment is disclosed which includes coating the conductor with a solution of a polyester resin of an alcohol selected from the group consisting of glycerine and pentaerythritol and a polycarboxylic acid selected from the group consisting of terephthalic, isophthalic, stilbenedicarboxylic, diphenic, tolanedicarboxylic and dibenzyldicarboxylic acids.

★ ★ ★

No. 2,686,740, INSULATED ELECTRICAL CONDUCTOR AND METHOD OF PRODUCING SAME, patented August 17, 1954 by John T. Goodwin, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich., a corporation of Michigan.

Here the method includes coating the conductor with a solution of a modified polyester resin of an alcohol selected from the group consisting of glycerine and pentaerythritol, an acid selected from the group consisting of terephthalic and isophthalic acids and dialkyl esters of these acids, and a silane.

★ ★ ★

No. 2,687,385, WIRE COATING COMPOSITION, patented August 24, 1954 by Emil H. Olson, Muskegon, Mich., assignor to Anaconda Wire and Cable Company, a corporation of Delaware.

This composition consists of a solute composed of 70% to 95% by weight of a cellulose ester of at least one aliphatic acid containing from 2 to 4 carbon atoms and 5% to 30% by weight of a resinous condensation polymer of a lower aliphatic aldehyde with one of the following: urea, thiourea, cyanamide, guanidine, and melamine. The solute is dissolved in approximately 1 part by weight of a lower monohydroxy alkanol containing 1-5 carbon atoms and having a boiling point of about 100°C., 3 parts by weight of a substance selected from the group consisting of benzene and its methyl homologues, and 1 part by weight of a lower dialkyl ketone containing 3-6 carbon atoms and having a boiling point of about 100°C. The composition has a viscosity in the range from 600 to 1500 centipoises at 100° F. and gelling to a non-flowing solid at about 65° F.

★ ★ ★

No. 2,687,386, WIRE COATING COMPOSITION, patented August 24, 1954 by Emil H. Olson, Muskegon, Mich., assignor to Anaconda Wire and Cable Company, a corporation of Delaware.

Here the composition consists of (a) 60% to 85% by weight of a cellulose ester of at least one aliphatic acid containing from 2 to 4 carbon atoms, (b) 5% to 30% by weight of a resinous condensation polymer of a lower aliphatic aldehyde with urea, thiourea, cyanamide, guanidine or melamine, and (c) 5% to 20% by weight of a drying-oil modified resinous condensation polymer of a polyhydric alcohol and a substance selected from the group consisting of polybasic acids and their anhydrides, the oil con-

Refinishing Wire Drawing Dies?

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Second in hardness only to diamond which costs a hundred times more

Johnson Steel & Wire Co., Inc. has substantially reduced the cost of refinishing their wire drawing dies by substituting NORBIDE Abrasive for costly diamond dust. Excellent for ripping or for fast stock removal as well as for accurate semi-finishing operations.

High accuracy is important to Johnson for Johnson "music" spring wire is drawn in 200 different sizes, all the way from .003" to .200".

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tent of the oil-modified polymer being in the range from 30% to 50% by weight thereof, the solute being dissolved in approximately 1 part by weight of a lower monohydroxy alkanol containing 1-5 carbon atoms and having a boiling point of about 100°C., 3 parts by weight of benzene or its methyl homologues, and 1 part by weight of a lower dialkyl ketone containing 3-6 carbon atoms and having a boiling point of about 100°C., the composition having a viscosity in the range from 600 to 1500 centipoises at 100° F. and gelling to a non-flowing solid at about 65° F.

★ ★ ★

No. 2,687,387, WIRE COATING COMPOSITION, patented August 24, 1954 by Emil H. Olson, Muskegon, Mich., assignor to Anaconda Wire and Cable Company, a corporation of Delaware.

This composition consists of a solute composed of (a) 80% to 95% by weight of cellulose acetate butyrate and (b) 5% to 20% by weight of a drying-oil-modified oxidizing alkyd resin in which the oil content is in the range from 30% to 50%, the solute being dissolved in approximately 1 part by weight of a lower monohydroxy alkanol containing 1-5 carbon atoms and having a boiling point of about 100° C., 3 parts by weight of benzene or its methyl hemologues, and 1 part by weight of a lower dialkyl ketone containing 3-6 carbon atoms and having a boiling point of about 100° C., this composition having a viscosity in the range from 600 to 1500 centipoises at 100° F. and gelling to a non-flowing solid at about 65° F.

The information in this section is furnished by the patent law offices of LANCASTER, ALLWINE & ROMMEL, 438 Bowen Bldg., Washington 5, D. C. Data listed is only a brief review of recently issued patents obtained by various U. S. Pat. Off. registered attorney for manufacturers and/or inventors. Complete copies may be obtained direct from Lancaster, Allwine & Rommel by sending 50¢ for each patent desired. Outside of the U. S. and Canada the cost is $1.00 for each copy.

New Technical Bulletin on Alodizing

American Chemical Paint Co., Ambler, Pa., has brought out a new bulletin entitled "Alodizing with Alodine No. 1200".

★ ★ ★

In it they point out the need of protecting aluminum surfaces to enhance corrosion resistance. Alodizing also improves paint bonding properties.

★ ★ ★

How "Alodine" provides protection, the equipment required and the steps necessary in the process are fully outlined.

★ ★ ★

Surface characteristics of Alodized aluminum, the colors that can be secured and results of tests are included in the bulletin, copies of which are available upon request.

New High-Load Spring Wire Has High Corrosion Resistance

The National-Standard Company, Niles, Michigan, announces the availability of a new stainless steel alloy spring wire which combines the corrosion resistance of stainless steel with the elasticity of high-carbon music wire. Known as alloy 17-7 Ph, this new wire is intended for applications where high spring loadings are required under corrosive conditions, and where great compactness of components is essential. Unlike other spring wire, 17-7 Ph does not lose elasticity under continuous exposure to corrosive atmospheres. High elasticity in this new alloy was obtained, say National-Standard engineers, by a combination of cold work before the spring forming operations and heat treatment after forming. Wire made from 17-7 Ph is available promptly in a complete range of sizes up to ⅛".

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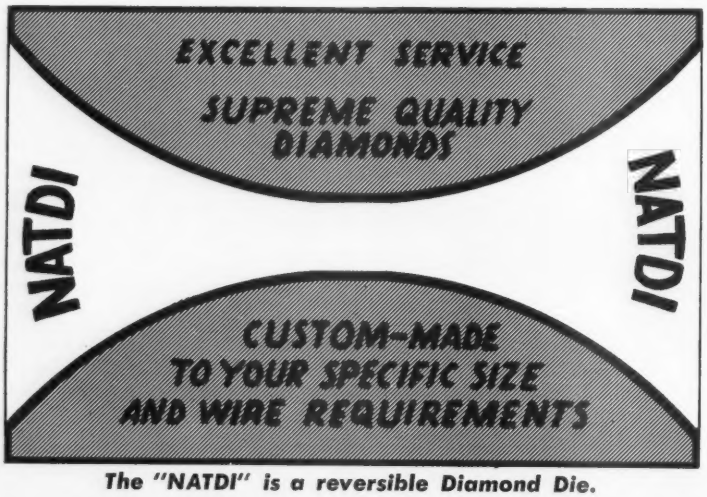
This is what you have been waiting for!
It is the answer to lower production costs.

GET THE UTMOST LIFE AND SERVICE
FROM YOUR DIAMOND DRAWING DIES.

NATIONAL WIRE DIE CO.

PRESENTS

THE "NATDI"



The "NATDI" is a reversible Diamond Die.

We waited months for full proof, so that you could be sure of the new die's performance. Customer's report:

1. UP TO 100% MORE PRODUCTION AT THE INITIAL SIZE.
2. AMAZING ABILITY TO BE RE-CUT WITHOUT SKIPPING SIZES. THIS MEANS MORE RE-CUTS PER DIE.

Our representatives will gladly call on you at your convenience.

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New Insulation Tester Announced

Peschel Electronics, Inc., 13 Garden St., New Rochelle, N. Y., has announced a new testing instrument for dielectric fault indicating and counting.

★ ★ ★

It is a continuous production type for non-destructive testing and it will neither burn nor mark the wire. This machine is a combination unit for spark-testing and pin-hole detection and counting. It is equipped with dual test electrodes and detectors. Counters are magnetic. Output voltages are adjustable from 0 to 20,000 volts, AC or DC.

★ ★ ★

The company, which specializes in electronic equipment for wire manufacturers heavy duty HV dielectric test sets for tank testing of large reels of cable, corona ionization test sets, HV test sets of all types, spark testers, pin-hole counters, sensitive Hipot Testers and bench re-spoolers.

★ ★ ★

Bulletins on any or all of this equipment will be sent upon request.

New Insulated Wire Catalog

A new catalog entitled "Miniature and Sub-Marine Wire and Cable" has been issued by **Tensolite Insulated Wire Co.,** Tarrytown, N. Y.

★ ★ ★

This is comprised of seventeen loose-leaf data sheets covering their various types of wire and services. They are bound into an attractive cover.

★ ★ ★

Each sheet describes the features and specifications of the wires, which include Tensolon High-Temp Wires, Military hook-up wire, spiral strip wire, cables, appliance wires, super-flexible wires and special Teflon coated wires.

★ ★ ★

The company also puts up assorted kits of wires for experimental and laboratory work.

★ ★ ★

A copy of this catalog may be secured by writing the company at 198 Main St., Tarrytown, N. Y.

Keystone Announces Expansion Plans

Expansion plans which will increase the wire mill's rod processing facilities, provide additional warehouse space and add to the finishing and shipping operations of the **Keystone Steel & Wire Company** have been announced by **R. E. Sommer,** President and General Manager. Total cost is estimated at more than one-half million dollars.

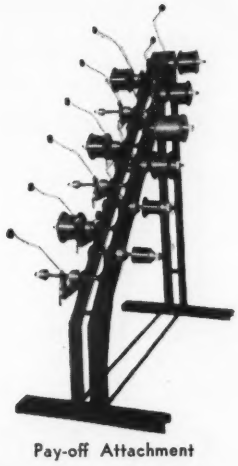
★ ★ ★

While most of the construction will be directed toward improvement of the company's shipping and warehousing facilities, Mr. Sommer said that other improvements will provide additional area for wire finishing operations and

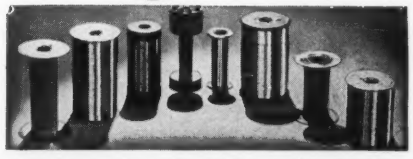
STANDARD UNI-DRIVE WIRE WINDER

INCREASE YOUR PRODUCTION
WITH THIS WINDER

Wire Winder



Pay-off Attachment



Various types of supply packages that may be wound on Standard Uni-Drive Wire Winder.

PAYOFF

Our payoff attachment is made with self-aligning ball bearings and a compensating attachment to control the tension of each end. Applies same tension when spool is empty as when full.

The new Uni-Drive Winder with Payoff Attachment is new in design and incorporates several improved and tested features. Production is stepped up through increased speed. It produces smooth, even and accurately wound spools of wire in single or multiple ends. All strands parallel—no over or under-winding. Automatic Stop-Motion controls each strand. Compensating attachment produces perfectly controlled tension. Traverse adjustable from 1¾" to 5½" between spool heads without changing cam. Designed especially for winding wire to be braided and shielded for electrical conductors up to ¾" diameter.
Payoff can be equipped with Carboloy Guide Inserts at additional cost.

STANDARD MILL SUPPLY COMPANY
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renovation of other existing facilities.

★ ★ ★

To improve service to customers of Keystone who manufacture industrial wire products, an 80 x 300 foot Bundling Department building will be constructed adjoining a rail loading spur at the northwest corner of the company's Bartonville property. Here all industrial wire will be bundled, weighed and prepared for shipment to manufacturers throughout the country. Warehouse space for agricultural and building trades products will be increased by addition of a 50 x 300 foot building adjoining the present warehouse. In still another addition, a 200 x 200 foot extension to existing buildings will provide space for new machinery, wire processing, and warehousing.

★ ★ ★

Other improvement activities at Keystone include the installation of a new soaking pit in the steel plant. The new pit will be approximately 16′ square and will hold more ingots at one time than two of the present pits. The roll-back pit cover alone for this equipment will weigh nearly 23 tons.

★ ★ ★

Presently nearing completion is a 20,480 sq. ft. building to house a 36-base gas-fired muffle furnace which will increase the company's wire mill rod processing capacities approximately 50 per cent. According to Mr. Sommer, this expansion will enable the company to produce more wire for the cold heading industry. "As a result," he said, "our operations will be more fluid, enabling us to offer manufacturers better service on this type of wire."

★ ★ ★

This construction program is in keeping with the company's program of continued improvement, designed to maintain Keystone's position in the steel industry and to provide even better service of quality steel and wire products to its customers.

When wrapping your wire or rod

...REMEMBER

It's the

Crinkle in the PAPER that COUNTS!

For a tighter, more compact wrap, specify—

"Arksafe" CRINKLED KRAFT WIRE WRAP

Easy to handle, simple to apply. Uniform crepe—Strong and *Economical*, too!

CONSTRUCTION: Single ply, waxed, asphalt laminated and reinforced.

In Standard Rolls and Widths for use on all types of wrapping machines. Also available in Hand Rolls.

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New Bulletin on Extender in Plasticizing Systems

A technical bulletin entitled "Halowax Product 4004", which describes a new low-cost extender in plasticizing systems for vinyl resins, has recently been issued by **Bakelite Company**, a Division of **Union Carbide and Carbon Corporation.** Because Halowax chlorinated paraffin extender 4004 has a much lower viscosity than comparable products, it possesses better wetting and faster pouring properties. These properties, in turn, result in increased production and economy. In addition, less changes in flexibility with changes in temperature are observed in finished products made with this new extender.

★ ★ ★

Significant property data on Halowax Product 4004, as well as typical formulations for compounds for injection molding, continuous flooring, sheeting and extruded wire insulation, are included in this 6-page folder.

★ ★ ★

Copies of this technical bulletin may be obtained from Bakelite at 300 Madison Avenue, New York 17, N. Y.

Making New Hard Gripping Nail

One of the pioneers in attacking the fastening problem scientifically was **Independent Nail & Packing Company** of Bridgewater, Mass., according to the Kaiser Aluminum News. This firm undertook to solve the problem of the nail that sometimes bent over backward, and applied its experience of many years of making nails, dating back to 1915.

★ ★ ★

Independent Nail & Packing was looking for an efficient nail, designed to drive in easily and pull out hard. Its engineers tested—and ultimately rejected—such devices as barbed, etched and twisted nails, coming up instead with a series of threaded nails that used the principle of the inclined plane, which drives in readily, but is hard to remove. Complexities of pitch and angle were so successfully solved that Independent is now the nation's largest manufacturer of threaded nails.

★ ★ ★

These nails have some unusual characteristics, proved in the laboratory and in the field. Tested in green framing lumber, two-by-fours held by regular nails gave up the ghost at 360 pounds pull. Independent's did not release—the wood framing itself broke at 1,640 pounds.

★ ★ ★

Independent makes these nails in steel and aluminum and other non-ferrous metals as required. And properly used, the aluminum nails, produced in manifold, specially-built nail machines stand up on any job on which contractors use them.

★ ★ ★

Aluminum nails made by Independent, a Kaiser Aluminum customer, are engineered to take full advantage of the metal's desirable characteristics. The company has succeeded in making aluminum nails from an alloy stiffer than generally used by others, and in gauges that produce best results with that metal. These nails are trade-marked "Drive-Rite".

Carbide Tool Proves Economy in Scarfing

Ten minutes is a fairly short life for anybody's carbide tool, heat or no heat, and regardless of the toughness of the work piece.

★ ★ ★

Tool life was less than that on a scarfing run on tubing of various diameter at Nikoh Tube Division of **International Rolling Mills,** Chicago.

★ ★ ★

Even at this rate of short tool operation, a high percentage of rejects was caused by grooves cut into the tube, preventing subsequent chrome plating from covering tube properly. Nikoh also was experiencing a great deal of tool breakage.

★ ★ ★

Engineers from **Carboloy Department** called in on the job, suggested tipping a standard tool with cemented carbide grade 78B. While former tools had failed after 900 feet of tubing per grind, the new tool averaged 6000 to 8000 feet per grind, with a maximum of 17,000 feet per grind.

USERS OF THESE CABLE REEL BORERS REPORT

PRODUCTION INCREASES UP TO 500%

In one single operation, this remarkable machine bores ALL the holes in a wooden cable reel head. In addition, it has the exclusive Root Patented Hydraulic Feed which provides a stepless range of feed from 2 to 29 strokes per minute. Operator is not handicapped by limited feed rate. This increases production tremendously. Can also be used for other boring purposes. Made in three sizes. *Write for Bulletin No. 132.*

"Can honestly say this machine alone has increased our production over 200%! Our profits increased 100%!"
V. Fairhurst, Mgr. New England Reel and Lumber Co.

ROOT
HYDRAULIC FEED
REEL BORER

Root Reel Borer being used by New England Reel & Lumber Co.

B. M. ROOT CO **YORK, PA.**

Heaviest Plate Shear

A Steelweld Shear, which will cut heavier plate than any previously built, has just been completed by **The Cleveland Crane & Engineering Company,** Wickliffe, Ohio, for a West Coast shipyard.

★ ★ ★

Designated as Model No. 24G-8, the machine is designed for production shearing of steel plate in sizes up to eight feet long by one and one-half inches thick.

★ ★ ★

As with the entire line of Steelweld Shears, the machine operates on the pivoted-blade principle, which is one of the important features that makes Steelweld entirely different from all other shears. The blade travels in a circular path without the use of guides and slides common with guillotine-type shears, thus eliminating a principal source of wear and shearing inaccuracies.

★ ★ ★

Despite the tremendous power required when making heavy cuts, the shear is noticeably quiet. The usual loud sound of the knife contacting the plate is considerably reduced because of the two blade counterbalances which cushion the blow.

★ ★ ★

The operating speed is twenty-two strokes per minute. Adjustments are provided to enable slitting and notching. Main and eccentric bearings are lubricated by an automatic oiler system.

Automation

Del S. Harder, Vice President—Manufacturing, **Ford Motor Company,** said in a talk in August at Davenport that a new concept of manufacturing called "automation" will create more jobs than ever before and produce a higher standard of living with less human effort.

★ ★ ★

He said the "prophets of doom" who claim automation will cause widespread unemployment and labor dislocation "just don't know what they're talking about."

★ ★ ★

Mr. Harder discussed the technical, sociological and economic aspects of automation—a manufacturing technique in which parts are moved automatically from one production process to another—before a conference of engineers and manufacturers. His address was titled, "Automation—Key to the Future."

★ ★ ★

He said the current ominous predictions from some quarters that automation will cause unemployment also were made about mass production and "all of the other significant advances in manufacturing in the last 50 years."

★ ★ ★

"Automation will do just the opposite," said Mr. Harder. "It will create more jobs, create more products at less cost, and increase the ability of people to consume. It is the key to less human effort in the future and an increase in

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Mesh Assembling Looms
Automatic Pirn or Bobbin Winders
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Wire Crimpers for wires up to 5/8" diam.

We have a complete line of Looms from the coarsest mesh up to 450 mesh per inch.

For further information write us giving details.

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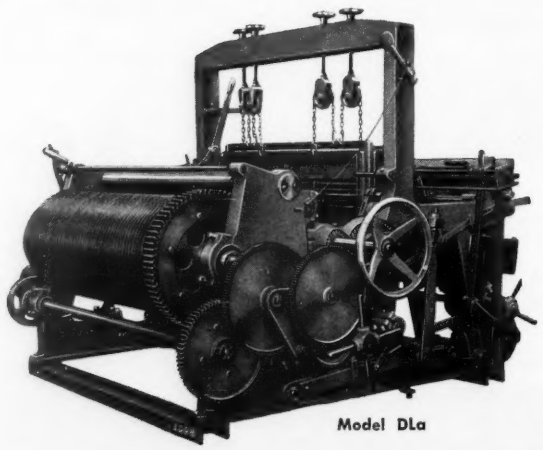


Model DLa

A Double Beat Loom having a Weaving range 1 to 20 mesh per inch with wires up to .100". Operated semi-automatically the loom can take uncrimped wires up to 1/8" dia. and pre-crimped wires up to 3/16" diameter.

our standard of living of tomorrow."

★ ★ ★

Asserting that the word "automation" has come to be a catchword used to describe almost everything automatic, Mr. Harder said that to him the term means a "new philosophy of manufacturing"—without which America's rising productivity may level off and even decline.

★ ★ ★

He cited Ford's original definition of automation as "the automatic handling of parts between progressive production processes." While still substantially accurate, he feels that the definition needs broadening to include design of parts, methods for their manufacture and production tool control systems.

★ ★ ★

Automation helps Ford, its employes and its customers in the following ways:

—It "assists in lowering our production costs by relieving manual effort" and by enabling machines to operate nearer their maximum-rated capacity.

—"The workers benefit by obtaining . . . less monotonous and boring and, consequently, much more interesting" and more highly-skilled jobs.

—The product's quality is improved by built-in inspection gages and by automatic handling which prevents damage to parts.

★ ★ ★

Mr. Harder said the automation philosophy is applicable to all types and sizes of industrial concerns, but warned that its application in any company depends upon the breadth of vision, imagination and courage of its top management.

New Coated Yarns for Electric Wire Announced

An exciting new field of wire construction and development has been opened by the creation of entirely new, custom built, coated yarns by Chemo-Textiles, Inc., Crompton, West Warwick, R. I.

★ ★ ★

Wire and cable engineers can now have real specialty yarns with which to build better electrical, chemical and physical properties into their products—particularly high heat resistant qualities.

★ ★ ★

A brief description of these coated yarns indicates the tremendous possibilities inherent in the process developed by Chemo-Textiles, Inc.

★ ★ ★

The process consists of coating any natural or synthetic yarn, particularly glass fiber yarns, in virtually any count size, both single and plied, with a consistent, uniform diameter coating of vinyl, silicone, silicone rubber, Teflon, nylon, latex, etc.

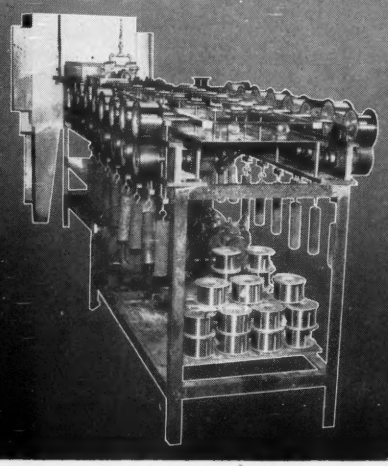
★ ★ ★

The coatings can be applied in wall thicknesses and compositions to suit the specific needs of individual insulated wire and cable manufacturers. Colors available in the various types of coatings are brilliant and stable.

★ ★ ★

Research and development is constantly under way to develop

MULTIPLY YOUR PRODUCTION OF PRECISION STAINLESS STEEL WIRE BY 300% OR MORE!



. . . And that's only the half of it. Fort Wayne Metals' new takeup and strand annealing unit provides you with solid-packed spools, eliminating expensive respooling operations. You get better wire of more uniform quality, and **three times as much of it** in the same length of time. Investigate this new production equipment now. It is a tried and proved product, developed by a leader in the wire making industry.

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FORT WAYNE METALS, INC.
3209 MACARTHUR DRIVE, FORT WAYNE, INDIANA

MANUFACTURERS OF PRECISION STAINLESS STEEL WIRE AND WIRE PRODUCTION EQUIPMENT

new coatings. This department is always at the service of wire and cable manufacturers to develop new coatings and variations of available coatings.

★ ★ ★

In addition to the coatings listed, Chemo-Textiles, Inc. produces colored glass yarn for identification markers and tracers and has, in the development stage, a conductive yarn for use as shielding.

★ ★ ★

Coated yarns are furnished on standard or special packages for winding, braiding or serving, and coated and colored glass fiber yarns are now in use by a growing number of leading insulated wire and cable manufacturers and are also under intensive evaluation by many others.

★ ★ ★

Working samples are available to all wire and cable manufacturers.

Low Atomic Elements Detected by New X-Ray Spectrograph Technique

A new technique has been developed for identification and quantitative analysis of elements present in specimens that extends the range of the Norelco X-ray Spectrograph to include Phosphorus, Silicon, Aluminum and Magnesium, it was announced recently by the Research & Control Instruments Division, **North American Philips Company, Inc.,** 750 South Fulton Avenue, Mount Vernon, N. Y.

★ ★ ★

Other recent work by the company has been previously announced wherein the X-ray Spectrograph range has successfully been extended to handle Scandium, Calcium, Potassium, Chlorine and Sulphur.

★ ★ ★

Only a few simple accessories are needed for use with the standard X-ray Spectrograph when work is performed in the low atomic range. Excellent reproducibility is attained and new fields are now open to the analyst and metallurgist concerned with the lighter metals used widely in industry and for defense.

★ ★ ★

The new technique has produced a twenty-fold increase in the response to sulphur radiation, a fact which is of utmost importance to investigations in the petroleum, metals and pharmaceutical fields.

★ ★ ★

Charts are available to show recorded results of tests run in the new low atomic element range. Industrialists who are interested in the new technique are cordially invited to visit the Norelco Application Laboratory in Mount Vernon, N. Y., where demonstrations are performed on request.

THE WIRE ASSOCIATION

invites wire men to join the organization and participate in its activities.

Write for a booklet on what it is and how it functions to

RICHARD E. BROWN

Executive Secretary

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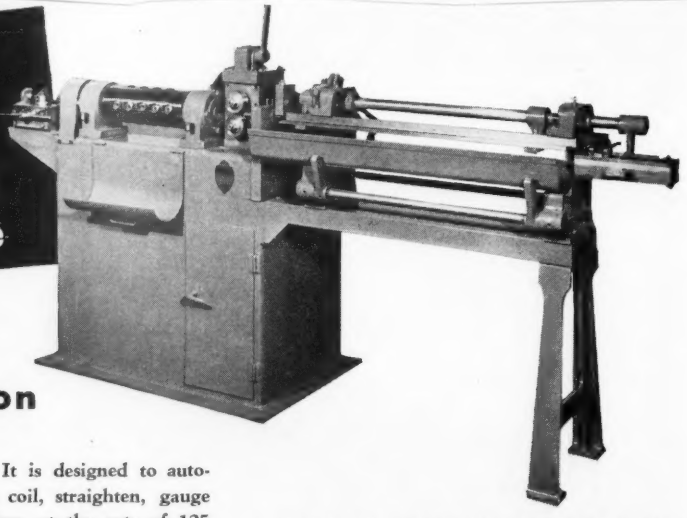
Announcing...

The NEW PATTERSON Wire Straightening And Cut-Off Machine



for fast automatic, low cost production

It's fast, accurate, easy to set up and operate. It is designed to automatically feed 1/16" to ¼" soft wire from a coil, straighten, gauge to desired lengths up to 40 inches, and cut clean at the rate of 125 feet per minute. Rugged in construction, simple in design, the Patterson machine is based on old established, tried and proven principles.

Variations of standard models are furnished to meet special requirements. Extensions can be furnished to cut lengths up to 12 feet or longer. Attractive territories available to progressive distributors of machine tools.

CHECK THESE FEATURES:

- Triple 0 Reeves Variable Feed Unit—regulates feet from 90 to 200 feet per minute
- Automatic Cut-Off Mechanism—clutch is actuated by solenoid switch which in turn is energized by a micro-switch
- Roll type instantaneous drive clutch
- 3-roll pre-straightener—standard equipment

The G. C. PATTERSON Machine Company

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Catalogs on Grinding Wheels

A new condensed catalog, No. 1052 of the most widely used grinding wheels carried in stock has just been published by **Norton Company.** A principal feature of the catalog is the supplement of net prices to the customer in various quantity lots. Net pricing was introduced in the abrasive industry by Norton earlier this year.

★ ★ ★

This 28-page illustrated booklet covers the subject of grinding wheel selection in considerable detail. Points covered include abrasive types, bonding materials, wheel speeds, wheel markings, standard wheel shapes, mounted points, and abrasive polishing grain.

★ ★ ★

Another new catalog, No. 1233, containing a comprehensive assortment of standard sizes of diamond grinding wheels and hones has just been published by Norton Company of Worcester, Mass. Included in the tables of this 52-page booklet is the net price to the customer of each item listed, in various ordering quantities.

★ ★ ★

The booklet also includes information on diamond wheel markings, selection of wheels, standard shapes of wheels, and suggestions on the use of diamond wheels and hones.

★ ★ ★

Copies of these catalogs may be secured by writing Norton Co., Worcester 6, Mass.

Frost Steel & Wire Builds New Warehouse

Frost Steel & Wire Company, Ltd., 250 Lottridge Street, Hamilton, Ont., has started construction of a $78,000 storage warehouse at Beach Road and C.N.R. right of way. The one-story structure will be 60 by 200 and of concrete and steel construction.

Davis-Standard Expanding Wire Machinery Line

Davis-Standard Sales Corporation, sole selling agents for **Standard Machinery Company,** is making a firm bid to become the top name in the wire machinery field. Already widely considered to be one of the leading suppliers of high-quality extruders for rubber and thermoplastics, Davis-Standard has added to its engineering staff men with the design talent and experience needed to produce new and improved wire machinery.

★ ★ ★

For more than a century, Standard Machinery has been manufacturing dependable industrial equipment. In 1933 the first molding presses for rubber were produced. These were soon followed by presses for molding shellac, celluloid, bakelite, and other synthetic materials. The line of Standard Machinery molding presses is now well recognized as a standard throughout the world.

★ ★ ★

In recent years, Standard Machinery has developed and built extruding machines for plastics, rubber, and the electrical wire and cable industries. The line of extruders has expanded steadily, and has grown to be the major part of Standard Machinery's output. More recently, emphasis has been on continuous vulcanizers and associated equipment (pay-offs, take-ups, capstans) for the wire insulating industry. The addition to its engineering staff of two top designers of wire machinery, **Alden Nelson** and **Frank Johnson,** is part of Davis-Standard's program to manufacture a complete, new line of machinery for the electrical wire and cable industry.

Expands Cold Draw Section at Huntington Works

A new cold draw section, which extends length limitations on rods and tubes and triples capacity for producing heat exchanger tubes, is now in operation at the Huntington Works of **The International Nickel Company, Inc.,** Huntington, W. Va.

The unit comprises a building extension 350 feet long by 108 feet wide, a draw bench capable of drawing some tubes and rods up to 85 feet, and a gas-fired annealing furnace 220 feet in overall length.

★ ★ ★

A feature of the new draw bench is an unique magazine loading device. It consists of a revolving cylinder in which six mandrels in sets of three each are placed one above the other. While the tubing is being drawn from the lower part of the cylinder, the upper three can be loaded in preparation for the next draw. At the end of a drawing operation, while the "mule" is being returned to start position, the cylinder rotates and brings three mandrels with tubes on them into position before the dies.

★ ★ ★

The new $1,250,000 cold draw operation is the second expansion of a major facility at International Nickel's Huntington Works during 1954. The first was a $1,700,000 distribution center which was put in service April 1.

Rome Cable Workers Reject Union

Production employees of the **Rome Cable Corporation** have voted overwhelmingly against representation by the International Association of Machinists (AFL).

★ ★ ★

In an election conducted by the National Labor Relations Board, 557 of the production workers voted against representation by the IAM, while only 116 favored the union. Only 26 of those eligible to vote failed to do so, and several of those were ill, according to **A. D. Ross Fraser,** President of the corporation.

★ ★ ★

This is the second time during 1954 that Rome Cable Corporation employees have rejected representation by the IAM. Last April the workers in the company's plant in Torrance, Calif., also voted down an attempt by the same organiza-

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NEP — SUM-FOAM — NEPTUNE
(Inhibitor) (Foamer) (Accelerator)

Parkin products are available in powdered and liquid form. Phone or write for a shipment today and begin getting better pickling at less cost right away.

You can save a lot of acid and a lot of metal by *controlling* your pickling operations with Parkin products.

Using Parkin products in the bath, you will cut down acid carry-over and dragout. You'll put an end to overpickling. You'll get faster, safer, cleaner pickling.

Your men will appreciate the change, too, because Parkin products act as a powerful deterrent to acid spray and fumes.

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PICKLING SPECIALISTS
Parkin of Pittsburgh
IN STEEL SINCE 1860

tion to be designated as the recognized bargaining agent for the employees there. Local 1875 of the IAM has represented maintenance workers in the Rome plant of the Rome Cable Corporation since 1944.

★ ★ ★

"We feel that this result indicates that most of our employees have liked the way we have been getting along together," Mr. Fraser declared after the election. "We are pleased at this expression of confidence, we hope that all of our employees, no matter how they voted, will join with us and will continue to work harmoniously together for the best interest of our employees and the company."

New Conductor Alloy is Developed by Alcoa

A new aluminum alloy for conducting electricity, No. 2EC, has been developed by **Aluminum Company of America,** Pittsburgh, Pa.

★ ★ ★

This new alloy is a material developed to meet the high performance requirements of the electrical equipment manufacturing industry.

★ ★ ★

No. 2EC aluminum conductor alloy has superior mechanical properties, with a slight sacrifice in electrical conductivity over other aluminum alloys used for conductors. Such properties are especially important for applications requiring high yield strength and low creep.

"New" Metals Processed with Versatile "Package" Rolling Mill

Research on roll-cladding of titanium on steel, carried on at the Cleveland laboratory of **Horizons Incorporated,** is one of the many uses for the versatile "package" rolling mill designed and built by **Stanat Manufacturing Co.,** Long Island City, N. Y.

★ ★ ★

Horizons' research uses for the mill also includes tests to determine the effect of roll-surface finish in the hot rolling of aluminum and aluminum alloys; determination of the work hardening characteristics and recrystallization temperatures of electrolytic titanium and zirconium; and experimental rolling of sheet and wire.

★ ★ ★

Stanat's "package" mill is ideally suited for laboratory research because of its small size and "big machine" ruggedness, which eliminates costly shutting down of production equipment for test work. The mill is equipped with dual heads and handles experimental ingot, rod, sheet, round and flat wire.

New Look in Diamond Dies

The National Wire Die Co., 30 Irving Place, New York has announced that they have passed the experimental stage, and are now producing the "NATDI", a new diamond die, shaped and polished equally from back and front, fully capable of being used to draw wire from both ends. This automatically makes it a fully reversible die.

★ ★ ★

The advantages as expressed by their users are:

"KNOW PARKIN" is right!

When you Know Parkin you'll know the finest Pickling Compounds available anywhere!

NEP — SUM-FOAM — NEPTUNE
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Parkin products are available in powdered and liquid form. Phone or write for a shipment today and begin getting better pickling at less cost right away.

You can save a lot of acid and a lot of metal by *controlling* your pickling operations with Parkin products.

Using Parkin products in the bath, you will cut down acid carry-over and dragout. You'll put an end to overpickling. You'll get faster, safer, cleaner pickling.

Your men will appreciate the change, too, because Parkin products act as a powerful deterrent to acid spray and fumes.

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1. **Extended initial size production of up to and, in many cases, over 100%. This is due to the fact that by reversing the die, before the reduction angle is badly worn, the drawing channel, or bearing, as it is commonly called, does not receive mauled wire that would rapidly deteriorate the bearing and so change the size. Thus, when the die is reversed, the wire is then drawn through a brand new reduction angle and a comparatively still perfect bearing. The benefits are easily recognizable.**
2. **When recutting becomes necessary, users know how often sizes are skipped, due to wear of the reduction angle. Therefore, having two sides to choose from brings about a minimum loss of recut sizes.**

★ ★ ★

Further information about the "NATDI" can be obtained by calling or writing the National Wire Die Co., 30 Irving Place, New York City 3, New York.

Carbide Applications to Machining Industry Reported at Meeting

Successful use of cemented carbides in overcoming several obstacles of the "production line in a circle"—the automatic bar machine—was recently reported to the machining industry.

★ ★ ★

Leading the field are engineers of **Cone Automatic Machine Co., Inc.**, Windsor, Vt., and **Carboloy Department of General Electric Co.** of Detroit, working jointly in a four-month-old continuing development program—to learn how to make effective use of cemented carbides on multiple spindle bar automatics—among the last of the machine tool carbide-holdouts.

★ ★ ★

Benefiting from the joint efforts of the two organizations are users of automatic machines. Studies of the two engineering groups indicate that automatic users can expect a greater return on their capital investment through production increases on the machines of as much as 50 to 100 per cent.

★ ★ ★

Although the joint development program is barely beyond its initial stages, it has made great strides in a short period of time. In a nutshell, here's what the engineers found:

1. **Multiple tool setups of automatic machines are not barriers to cemented carbides.**
2. **Tool holders, as well as auxiliary attachments, should be engineered to meet job conditions of automatics.**
3. **Proper selection of carbide grades and correct tool geometry are more important in applying carbides to automatics than to other machines.**
4. **Adequate horsepower to the work spindles is essential.**
5. **A good method of supplying a generous amount of water-based coolant to the cutting areas is a must.**

★ ★ ★

In the past, attempts to apply cemented carbides to automatic bar machines proved unsuccessful because neither the users nor machine tool builder could afford the time, due to the production schedules, to delve into the compounded problems created by the "automatic production line."

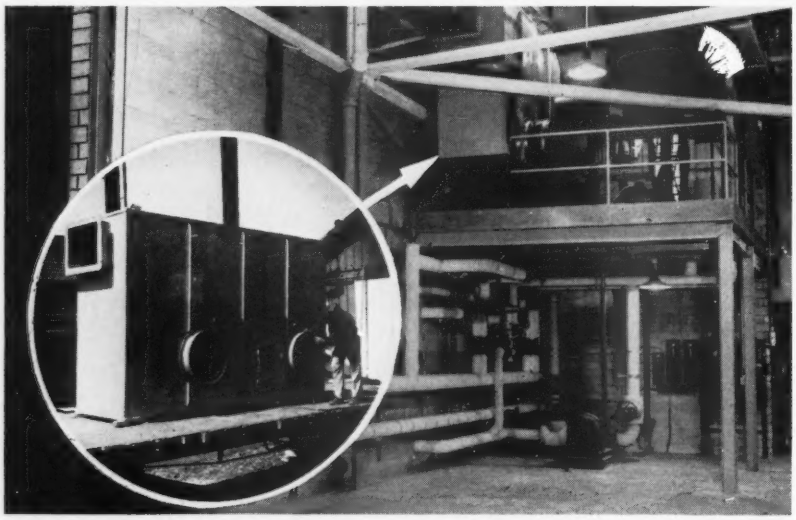
★ ★ ★

To date cemented carbides have been successfully applied to practically every turning type of production machine tool with the exception of the multiple spindle bar automatic.

★ ★ ★

To meet the situation, Cone as well as other automatic builders

FOR CONTROLLING ACID FUMES IN YOUR PICKLING OPERATIONS



Rigidon duct system installed in new wire mill to handle sulfuric pickling fumes. (Engineered by Austin Company, Cleveland, Ohio).

SPECIFY RIGIDON SOLID PLASTICS

√ Acid protection inside and out

√ Round or rectangular

√ Easy to install

√ Low initial cost

√ Good chemical resistance

CHEMICAL-PROOF LININGS-TANKS HEATERS PLASTICS

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COATED AND LINED FANS • PICKLING TANKS • NOCORDAL IMPERVIOUS GRAPHITE EXTERNAL HEAT EXCHANGERS • MONEL PICKLE HOOKS • LEAD STEAM JET AGITATORS • ACID PROOF MAINTENANCE MATERIALS FOR EXTERIOR APPLICATIONS • SPECIAL LEAD FABRICATIONS.

"souped up" the machines as far as possible with high speed steel cutting tools. The companies also struggled without success to transform the machines into push-button affairs to both meet the cry for more speeds and feeds, and to get away from human errors of poorly trained operators.

★ ★ ★

Today, as a result of the joint automatic machine-cemented carbide development program of Cone and Carboloy, the introduction recently by the latter of new cemented carbide grades such as the series 300 (grades 350 and 370) especially suited for continued, high speed operations, the answers are beginning to show up.

Machinery Manufacturer Reorganizes for Expansion

Forerunner to new machinery developments and a major expansion program, former company president, **D. H. Prutton,** became Board Chairman and **Howard D. Prutton,** succeeds him as President of the reorganized **Prutton Corporation,** manufacturer of "world's fastest, lowest cost" thread rolling and tapping machinery, plant and offices at 5295 West 130th Street, Cleveland, Ohio.

★ ★ ★

Formerly named the **D. H. Prutton Machinery Company,** the firm was operated for 25 years by **D. H. Prutton.** His son, **Howard D. Prutton,** joined the company in 1950 as Vice President. He is a member of The Wire Association.

★ ★ ★

During that period, the Prutton Rollmaster, Models 125, 200 and 300, were introduced as offering "world's fastest, lowest cost thread-rolling." They were first to incorporate the revolutionary and unique "planetary" die principle for high-speed, class 3 fit roll-threading of solid parts (Models 125, 200) and hollow parts (Model 300) in a wide range of sizes, shapes and metals.

★ ★ ★

The company also developed the Prutton Tapmaster, Models 10, 20, 30 and 40 as "world's fastest," tapping machines. Each is a 3-spindle unit, thus able to speed productivity at a 3 to 1 ratio.

New machinery developments and expansion plans will be announced soon.

New Steel Catalog Sections

The new steel catalog sections have been released by **Firth Sterling Inc.** on C.Y.W. Choice and Type 420 Stainless Steel. The catalog sections give complete information as to typical analysis, characteristics, typical applications, forging, general heat treatment, annealing, hardening and tempering data.

★ ★ ★

C.Y.W. Choice is a chromium alloy hot-work steel developed for dies and other tools which are subject to heavy pressure while in contact with hot metal.

★ ★ ★

Type 420 was the original stainless steel made by Firth Sterling in August, 1914. Commonly known as the cutlery type, it is useful for many other purposes where a combination of good resistance to corrosion and wear is a factor.

★ ★ ★

Bulletins C.S. 10-280 and C.S. 25-150, respectively, covering properties of the alloys, will be sent upon request.

ARE YOU A MEMBER OF . . .

THE WIRE ASSOCIATION?

With the Silver Anniversary Annual Convention of the Association approaching—that you should attend—it is a good time to decide to join and participate in the activities of our society.

All Wire Men Should Belong

If you are engaged in the manufacture of rods, wire, wire products or electric wire and cable, you will find many benefits accruing to you personally through membership.

A booklet describing the Association, its activities and services will be sent to you on request.

Write to

RICHARD E. BROWN, Executive Secretary

THE WIRE ASSOCIATION

453 Main Street ● **Stamford, Conn.**

New Cord for Power Tools

A new electrical cord for use with power saws, drills, grinders, buffers and similar types of portable electrical machinery, which will last almost twice as long as the highest quality cords now in existence, has been developed by **United States Rubber Co.**

* * *

It is the result of more than 10,000 laboratory and field tests carried on for two years. During these tests, the reasons for cord failure were determined and specific antidotes for the wear-causing factors—heat, oil, impact, abrasion, flexing, cutting tension and tear—were designed into the cord.

* * *

On the basis of tests of over 1,000 cords, the new cord, called U. S. Royal Master Portable Cord, is rated more than three times as resistant to wear as low-priced cords made by the continuous vulcanization process, and 88 per cent stronger than the highest quality molded cords in use.

* * *

It is also rated superior to a composite cord combining the best features of cords now in existence. The new, lead-cured cord is available mainly as a replacement or maintenance item. While similar to conventional cords in appearance, it differs in design and materials.

WILLEY'S
TUNGSTEN CARBIDE

METALS
DIES
TOOLS
for the Wire Industry

Rough Cored Standard Dies
(from stock)
ROUND SQUARE HEXAGON OCTAGON

Rough Cored or Finish Ground
(Immediate quotations on receipt of your prints—
Fast delivery schedules)
SPECIAL DIES WEAR PARTS MANDRILS
NIBS—HEADING AND EXTRUSION DIES

For complete information:

Willey's Carbide Tool Co.
1340 W. VERNOR HWY. • DETROIT 1, MICHIGAN

Titanium Fasteners Now Available

Camcar Screw & Mfg. Corp., producer of precision cold formed parts, announces it is now ready to supply standard and special titanium fasteners in production quantities made of RC 130B titanium.

* * *

This alloy is a special wire composed of 92% Ti., 4% Al. and 4% Mn. Camcar can produce parts from this material with tensile strengths of 150,000 psi, minimum, and shear strengths of 95,000 psi, minimum. It can withstand temperatures up to 800° F.

* * *

Of particular interest to builders of airframes, engines and accessories are the drastic weight saving possibilities offered by this metal. The alloy weighs approximately 44% less than alloy steels of corresponding strength. It also has advantages in marine and chemical applications because of its excellent corrosion resistance.

* * *

Further information on standard and special titanium fasteners can be obtained from Camcar Screw & Mfg. Corp., 629 Eighteenth Avenue, Rockford, Ill.

Techalloy Completes Expansion Program

A new building has been completed by the Techalloy Company, Rahns, Pa. This company, which was organized in January, has already outgrown its original buildings and has spent $250,000 for this expansion. Techalloy management attributes this growth to its specialization of serving those customers in the electronics, in-

dustrial electrical equipment, instrument, industrial wire cloth, appliances and mechanical industries who have tighter specifications than have been commercially available.

★ ★ ★

Early in the year, the original empty building was fully equipped with wire drawing and annealing equipment, plus laboratory and quality control instruments. Tungsten carbide and diamond die recutting and polishing departments serve their drawing die requirements.

★ ★ ★

For the past several months they have been making regular shipments of Monel, Nickel, Inconel and Techalloy stainless steels in sizes ranging from ¼" down to .002" in diameter.

★ ★ ★

The new building will be devoted to heavy wire drawing, annealing and cleaning. Machinery is now being installed and the first finished wire produced with these additional facilities will be shipped in September.

Magnet Wire Firm Uses New Type of Packaging

Rea Magnet Wire Company, Fort Wayne, Ind., producer of high quality magnet wire, has announced the availability of ReaPak, an innovation in the packaging of magnet wire.

★ ★ ★

The new package is being produced under a license granted by the **Continental Can Company.** Round magnet wire is usually shipped on spools having a capacity of 10 to 80 pounds per spool. ReaPak makes possible the shipment of continuous lengths of magnet wire weighing 500 pounds or more per drum.

★ ★ ★

ReaPak not only affords better protection for magnet wire in transit, but also effects many other real economies because of scrap reduction, lower coil winding costs, reduced handling charges and lower container investment.

ReaPak is particularly adaptable for mass production purposes and fills a long expressed electrical industry desire for larger and more easily handled packages of magnet wire.

★ ★ ★

Presently, production is confined to sizes #22 to #10 A.W.G., the range of sizes most commonly used in mass consumption of magnet wire insulated with formvar and enamel.

Carboloy Names Distributor in Aurora

Dietz Industrial Supply Co., Aurora, Ill., has been named an authorized distributor for **Carboloy Department of General Electric Company,** Detroit.

★ ★ ★

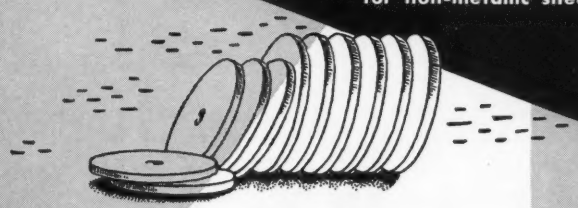
The organization will carry the Department's entire line of standard cemented carbide tools and blanks, carbide-tipped masonry drills and diamond wheel dressers.

Champion of them all...

Malkraft CREPED SHEATHING PAPER

pre-processed

for non-metallic sheathed cable



Yes! most users are ordering MALKRAFT CREPED Sheathing Paper.

MALKRAFT CREPED mill slit pads, unspliced, crimp through the winding dies forming perfect layers over the conductors. Pre-processed at the mill, MALKRAFT CREPED mill slit pads are ready for use when delivered. No dampening, softening or further processing needed.

Management is economizing with mill slit pads. The savings in time, waste material, insurance and equipment maintenance is providing more production area.

Join the many manufacturers of non-metallic sheathed cable, who are already using MALKRAFT CREPED paper for better winding results.

MALKRAFT CREPED paper is also being used as a DAM.

CHAMPION PAPER PRODUCTS COMPANY

Executive Offices: Union, New Jersey Mill: Bellows Falls, Vermont

Durall-T Now Approved as Underground Feeder

A long-time favorite for house wiring and fully approved as Types NM and NMC nonmetallic-sheathed cable, Anaconda Wire and Cable's versatile Durall-T, a thermo-plastic-insulated and jacketed cable, now is approved as Type UF, for much more severe service, under the new underground-feeder classification of the 1953 National Electrical Code.

★ ★ ★

Durall-T has figured most prominently recently in barn-wiring applications for obvious reasons: It is highly resistant to chemicals, moisture, corrosion, fungi and mechanical damage and similar "harsh-atmosphere" locations, all of which abound on farms. It is extremely pliable, tough, easy to install. Now, it is approved for use in underground circuits on the load side of the meter; in addition, it can be installed in inside and outside walls of masonry block or tile or imbedded in plaster. Durall-T is flame resistant, won't burn; available in two- and three-conductor makeup.

New Catalog Section on Soldersealed Potheads

Anaconda Wire & Cable Company has just issued a new addition to Section 13 of its General Catalog under the title Solder-Sealed Potheads. It is indexed as 1330, a subsection of Section 13 having the general title, Potheads and Terminals. It is also available as a separate catalog. Ask for publication number 6-79-30.

★ ★ ★

Anaconda's soldersealed line has been added since issuance of the General Catalog (No. C-79). The new line offers cable users another source of gasketless potheads.

★ ★ ★

Section 1330 is complete in 18 pages. The sealing process is described in detail; photographs and drawings in profusion show construction of potheads; field installation is given briefly. Most important, tables list dimensions and pertinent information for all sizes, for compound-, oil- and gas-filled pothead installations 15,000 to 46,000 volts.

New Plastic Cement for Tanks

The Atlas Mineral Products Company announces the development of a neutral setting plastic cement called Vitroplast having excellent adhesion to a wide variety of surfaces. In addition to being resistant to many solvents, salts and acids, it is also resistant to oxidizing agents, such as chlorine dioxide.

Builds Nail Plant Addition

Dickson Weatherproof Nail Co., Evanston, Ill., is building an addition to its Evanston plant. The added space of 9000 sq. ft. will increase floor area by about 45 per cent. The new facilities are scheduled to be completed by October.

Safety Directors declare "PLAY IT SAFE"
one of the best safety films ever made

It's available now for plant showings—

New full-color safety motion picture with sound shows how to *prevent* grinding-wheel accidents. Illustrates four major causes of breakage: (1) Improper Handling, (2) Storage, (3) Overspeeding, (4) Abuse.

To show "Play It Safe" without cost, in your plant or at your association meeting—write to the Peninsular Grinding Wheel Sales Corporation, Dept. A.

Just as "Play It Safe" will help you solve your safety problems, Peninsular Sales Engineeers can help you with your grinding problems. Their on-the-job analysis of operational requirements means the right wheel for the job. Too, consistent performance of Peninsular Wheels through uniform manufacture means greater safety and low cost. Call or write Peninsular today.

PENINSULAR

GRINDING WHEEL SALES CORPORATION

Plant and General Offices: 729 Meldrum, Detroit 7, Michigan

SPECIALISTS IN RESINOID AND VITRIFIED BONDED WHEELS

INDIVIDUALLY PENINSULAR ENGINEERED

SINCE 1889

The Application of Wire and Cable to a Wire and Cable Plant

(*Continued from page* 1176)

duce aluminum sheathed cable as a wiring-method on this continent, and has piloted it through the lengthy procedure of its acceptance as such by our Canadian Electrical Code, it is to be expected that we should use it where applicable in our own operation. However, since we are manufacturers of wire and cable of almost every other type as well, this could not have been done had this material not been able to stand on its own feet economically. It has been found, however, that as soon as electricians become accustomed to the characteristic "feel" of aluminum sheathed cable, very worthwhile savings may be realized both in material and labour, compared with building-wire in steel conduit. **Table 1,** recently compiled by a well-known Canadian consulting

"THE MANUFACTURE AND PROPERTIES OF STEEL WIRE"

The newest book on Steel Wire, written by Anton Pomp and translated into English by C. P. Bernhoeft, Dipl. Eng. Published in London by The Wire Industry. 358 pages, illustrated. Covers all the latest developments in wire processing, including mechanical descaling, die shapes and testing. Entire range, from rod to finished products, is treated.

Price: $11.80 per copy. May be ordered through

WIRE & WIRE PRODUCTS, 453 Main St., Stamford, Conn.

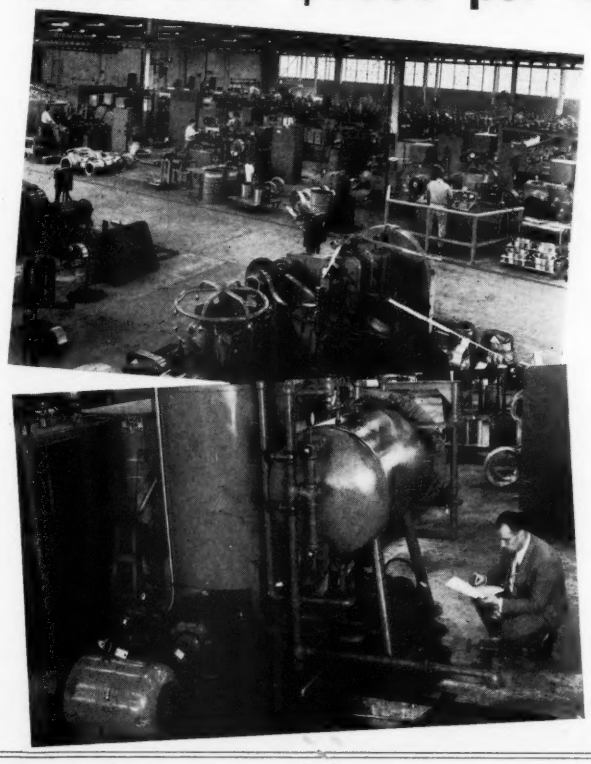
TABLE I

SUMMARY OF DETAILED COSTS

440 VOLT MOTOR WIRING (100 FT. RUN)

		R.C.D.B.		Aluminum Sheathed		Teck		Pyrotenax	
H.P.	F.L. Amps.	Cable Size	Total (8)+(9) $	Aluminum Sheath Size	Total (14)+(15) $	Teck Cable Size	Total (20)+(21) $	Pyrotenax Size	Total (26)+(27) $
Up to 10	14.0	#12	42.43	3/c #12	44.41	12/3	43.64	3/c #14 (386/3)	49.24
15	19.0	#10	53.75	3/c #10	55.51	10/3	52.79	3/c #13 (422/3)	59.24
20	26	#8	63.50	3/c #8	77.62	8/3	72.21	3/c #11 (453/3)	68.84
25	32	#6	89.26	3/c #8	77.62	8/3	72.21	3/c #9 (516/3)	92.24
30	39	#6	89.26	3/c #6	96.82	6/3	86.73	3/c #8 (562/3)	102.41
40	51	#4	125.85	3/c #4	126.42	4/3	121.38	3/c #6 (641/3)	140.74
50	63	#2	145.88	3/c #3	143.60	2/3	155.36	3/c #4 (720/3)	170.56
60	75	#1	179.93	3/c #2	163.40	2/3	155.36	3 #4 (386/1)	177.14
75	90	#1/0	224.30	3/c #1/0	218.10	3/c #1/0	216.42	3 #3 (422/1)	199.94
100	123	#3/0	280.71	3/c #3/0	269.92	3/c #3/0	281.94	3 #1 (484/1)	264.66

SAVE over $1000 per month on Wire Drawing



This wire drawing concern substituted a mineral oil for a soluble oil in lubricating dies in its 22 Vaughan wire drawing machines. By Hercules-filtering this oil satisfactory lubricating results were obtained and the manufacturer saved $1000 a month.

By using a Hercules Filter for its Sendzimer rolling mills and substituting a low cost filter medium for an expensive one used formerly net savings of $225 every six weeks were obtained.

Write for 4-page bulletin with full details of this installation and the savings effected.

HERCULES FILTER

CORPORATION

191 ETHYL AVENUE

HAWTHORNE • NEW JERSEY

engineer, sets forth a comparison, in very conservative figures, between two or three types of common wiring systems. Units of material and labour apply to the Montreal district, in 1952.

★ ★ ★

It is well to bear in mind, however, that Table 1 deals merely with the cost of material and installation on a straight 100-foot run of the competitive materials, the outstanding economies of the newer material such as aluminum-sheathed cable are best realized in those installations in which the ease of training of these materials is of the highest advantage. Under these circumstances the saving in condulet fittings and the cutting and threading of special lengths of conduit pipe offer economies far in excess of those shown in the table.

A WET-DRAWING PROBLEM THAT'S SIMPLER THAN A-B-C!

If you are wet-drawing non-ferrous metals, you'll find that Nopco DURPONS provide optimum performance for *twice as long* as conventional wire-drawing compounds. Yet they cost you no more.

There are two sound reasons for this profitable performance: All Durpon compounds contain (1) a buffer, to maintain the pH level, keep the emulsion from breaking; (2) a special sequestering agent, which holds the metal particles away from the effective drawing ingredients, *keeps the bath clean.*

Try some of these high-performance wire-drawing compounds today. You won't need anything more complicated than a slate to keep your comparative records. And you'll come out way ahead!

"Stay Stable Longer"

DURPON—for intermediate gauge wire

DURPON L—for heavy wire, rods, and tubes

DURPON FW—for fine wire

Mail coupon for technical bulletin and free trial sample.

*Reg. U. S. Pat. Off.

NOPCO EVOLVED THRU RESEARCH

NOPCO CHEMICAL COMPANY
Harrison, New Jersey
Cedartown, Ga. • Richmond, Calif.

NOPCO CHEMICAL COMPANY, Harrison, N. J.
Gentlemen: Please send me a copy of your technical bulletin and a free trial sample of: DURPON ___
DURPON L ___ DURPON FW ___
NAME_____TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ZONE___STATE_____

New Low-Cost Rectifier Unit

Designated "MagniVolt." A new type high-performance AC to DC regulated selenium rectifier with magnetic amplifier control. Provides closely regulated DC power in a highly dependable, compact, very low cost unit. For a wide variety of electronic and electrical applications requiring DC source.

★ ★ ★

Construction provides compactness, lightweight and minimum space requirement for mounting in standard relay racks or standard cabinets. Incorporated standard AC input switch, fuse, pilot light, input and output posts. All static components eliminate expendable elements such as vacuum tubes or other moving parts providing maintenance-free, efficient operation. Variations of the "MagniVolt" principle have been found to be applicable as a minimum cost, static regulator for rotating equipment. "MagniVolt" Bulletin RRPSM VF-852 available upon request from The **Inet Div., Leach Corp.,** 441 Santa Fe Ave., Los Angeles 58, Cal.

Fastener Concern Buys West Coast Business

Townsend Company, New Brighton, Pa., has announced the purchase of the **West Coast Tool & Supply Company,** manufacturer of flexible ejection chutes used in weapons for aircraft and armored ground vehicles.

★ ★ ★

President F. R. Dickenson of Townsend said his firm bought the Los Angeles company to "increase our line of products serving the aircraft industry, thereby providing greater stability in operations."

★ ★ ★

Townsend, nation's oldest manufacturer of fasteners and largest producer of rivets and cold headed parts, is one of the chief suppliers of rivets for the aircraft industry.

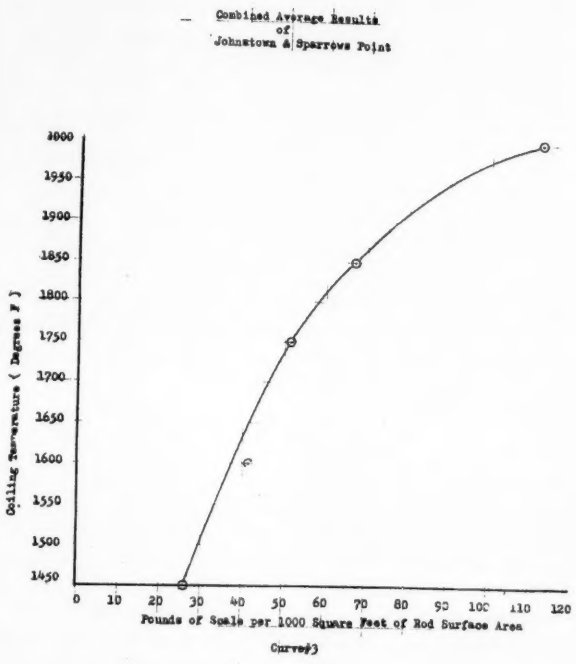
★ ★ ★

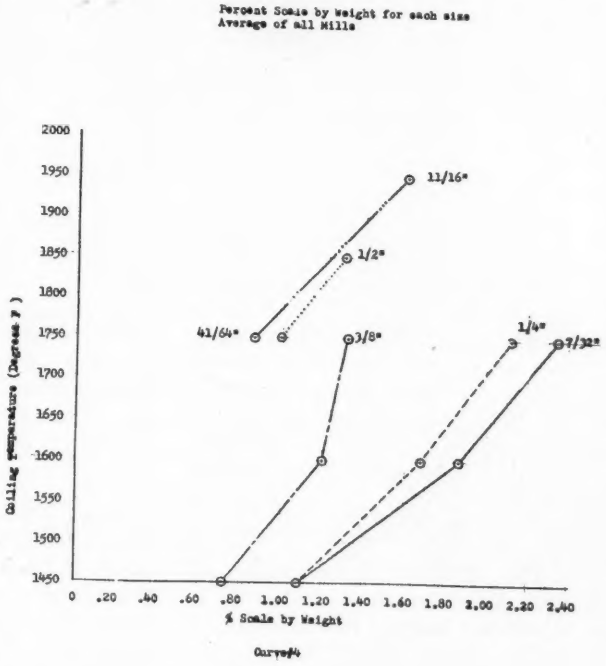
The West Coast Tool & Supply will be continued as a wholly-owned subsidiary, but certain manufacturing operations will be consolidated at the Santa Ana, plant.

The Effects of Coiling Temperature on Hot Rolled Rod

(*Continued from page* 1142)

in this report, we conclude that whenever it is possible to coil rods at 1450° F, there will be an increase in yield, a savings in pickling cost both in acid consumption and pickling time, and an improved surface on the finished rod.





AUTOMATIC TORSION COILER, Model ASF-3 for wire diameters from .04" - .16".

HACK AUTOMATIC MACHINES FOR THE SPRING INDUSTRY.

Manufacturing Program:

Automatic Universal Spring Coilers
Automatic Torsion Spring Coilers
Automatic Tension Spring Coilers
Automatic Flat Spring Coilers
Automatic Coilers for armoring Coils
Loop Bending Machines
Spring End Grinding Machines

KARL HACK · Maschinenbau · REUTLINGEN (Württ.) Germany

Sole Agents: HANCOR, INC., 262 Mott St., New York 12, N. Y. • Telephone: CAnal 6-0545

Tainton Organizes Affiliate to Handle Peen Plating Process

The Tainton Company, 3100 Elm St., Baltimore 11, Md., who operate a research and development laboratory, have organized a new corporation, **Peen Plate, Inc.,** at the same address to handle the licensing of their Plating process.

★ ★ ★

This process is one by which one metal can be applied to metal parts or forms without using an electrolytic or the conventional hot-dip process. Nails, chains, screws, hardware and a great variety of metal objects can be plated with zinc, brass, cadmium, tin, etc., to produce coatings that have a high degree of adhesion, ductility and protection against corrosion.

★ ★ ★

The company has already licensed a number of concerns, by whom the process is being used to plate a great variety of products to desired thicknesses of coatings. Bright or matte finishes can be obtained.

★ ★ ★

Full information is available upon request to Peen Plate, Inc.

Secures Financing for Expansion

The private placement of $13 million of its promissory notes has been announced by **T. M. Evans,** President of **H. K. Porter Company, Inc. The First Boston Corporation** acted for the Company in the transaction. Mr. Evans said that the funds would be used to further the Company's expansion plans which already this year have resulted in the purchase of **The McLain Fire Brick Co.,** Pittsburgh, Pa., and **Pioneer Rubber Mills,** Pittsburg, California.

★ ★ ★

Other Porter divisions are: **Alloy Metal Wire, Buffalo Steel, Connors Steel, Delta-Star Electric, Leschen Wire Rope, Quaker Rubber Corporation, The Watson-Stillman Company,** and **Watson-Stillman Fittings.**

Continuous Patenting, Cleaning, and Coating

(*Continued from page* 1140)

series of wire guides (see figure 27) turns the plane of the path of the wire so that it is perpendicular with respect to the floor, and a set of sheaves on each take-up block guides the wire onto the block (see figure 28). This is a feature to permit the operators to work closer to the blocks without interfering with the wire. On the first rig, the wire approaches the blocks in a plane parallel to the floor, which means that the operators have to strip the blocks while standing away from them.

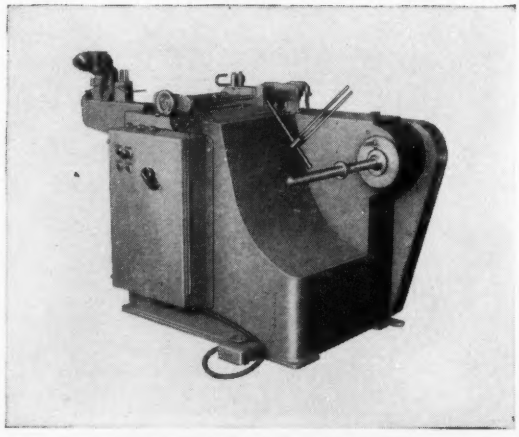
★ ★ ★

With the tube plugging problem eliminated and with the use of two coating pans, the second rig has been practically in continuous operation since the start. Only one serious problem has developed to cause some concern to the Corporation. As a result of burning city

WIM

Engineered for Performance

WIM equipment combines practical design and rugged construction in a line of smooth operating wire handling machines. An example is the WIM Model A Respooler. Here is a conservatively engineered and precisely built high speed machine. Operating simplicity is stressed and dependable performance is featured. Write today for further information. Our engineering staff will be glad to help work out your special problems.



WIM MODEL A RESPOOLER

WIRE INSULATING MACHINERY, INC.

Division of Machinery Electrification, Inc.

Northboro Mass., USA

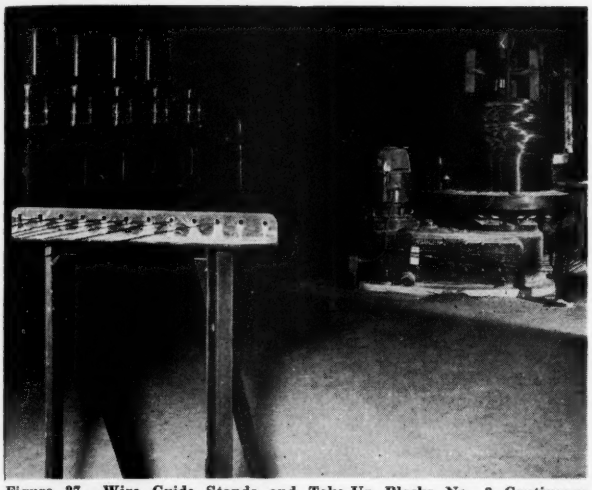


Figure 27.—Wire Guide Stands and Take-Up Blocks No. 2 Continuous Patenting, Cleaning, and Coating Rig.

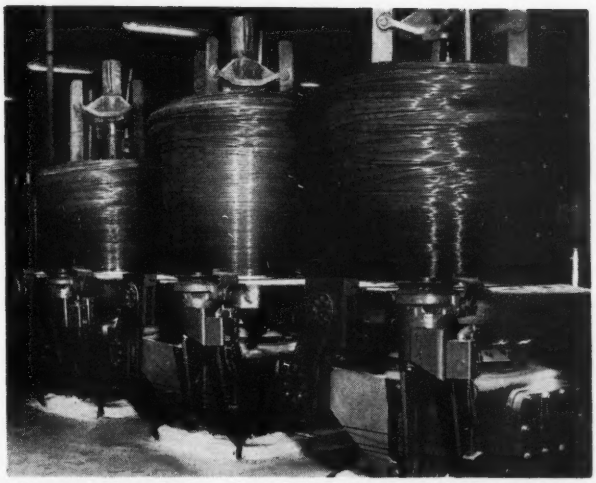


Figure 28.—Wire Guides and Take-Up Blocks No. 2 Continuous Patenting, Cleaning and Coating Rig.

gas internally to form the atmosphere, carbon cracks out of the gas when it is injected into the hot furnace and builds up around the atmosphere ports in the form of stalactites. Eventually this growth blocks the furnace internally, causing the wires to break and preventing the crew from stringing up the broken wires.

★ ★ ★

At the same time this condition is going on, the atmosphere escape ports plug rendering them useless. They can be cleaned out, but the condition will only repeat itself every few hours.

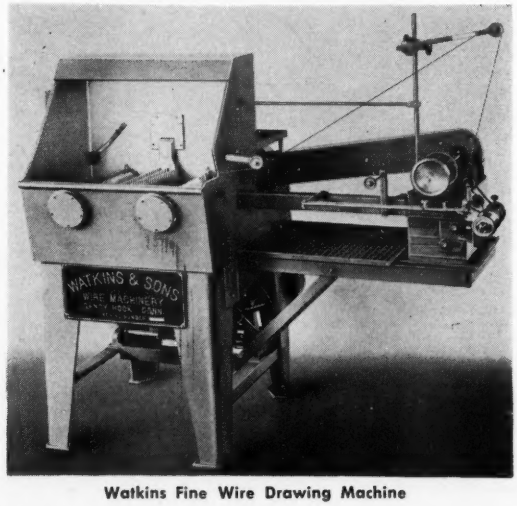
★ ★ ★

After this carbon build-up condition has transpired for six to ten weeks, the operation of the unit is suspended for a shift or so while the furnace is blown out with air. The carbon burns out by combining with the oxygen in the air and the deposits are eliminated.

★ ★ ★

This condition will be eliminated by the introduction of preburned

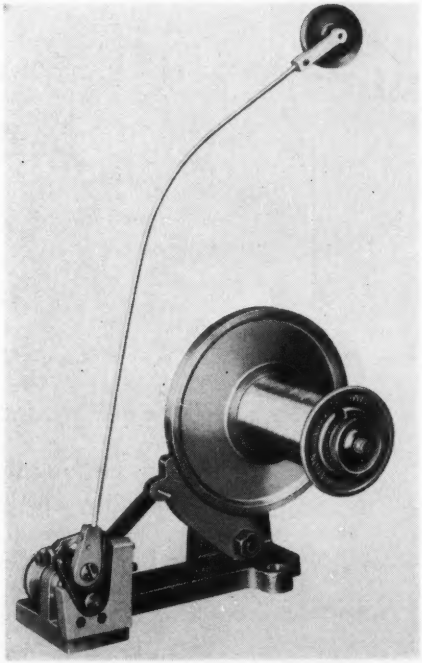
FINE WIRE DRAWING EQUIPMENT



Watkins Fine Wire Drawing Machine

A precision made machine for drawing fine wire to close tolerances. Ball bearing throughout, with vari speed motor driving through V-belt. Equipped with 5" rolls and 13 passes for wire to B&S 40 or 3" chrome plated rolls with 21 passes for finer wires. Has lubricant tank, provided with pump for circulation.

Special machines built to your specifications.



Let-Off for Handling Fine Wires

For details and prices, write

R. S. WATKINS MACHINE SHOP

GLEN ROAD, SANDY HOOK, CONN.

gas into the furnace as the atmosphere. This will be accomplished by the installation of an external unit to burn the city gas, and then pump the burned gas into the furnace. The use of the unit will reduce the cost of maintaining an atmosphere by approximately forty percent.

★ ★ ★

Despite the problems encountered with the operations of the two rigs, they have proven generally to be highly satisfactory and are more than successfully fulfilling every original purpose.

Samuel A. Rea Elected President of Rea Magnet Wire

Rea Magnet Wire Company, Inc., Fort Wayne, Ind., has announced the election of **Samuel A. Rea** to the office of president to succeed his father, **Victor F. Rea**, founder and president of the firm since its inception.

Welded Wire Fabric Used in Cleveland's Streets

Cleveland's Public Square has been given a steel jacket to help it withstand the ravages of heavy bus and truck traffic.

★ ★ ★

Mayor Anthony J. Celebrezze and executives of **American Steel & Wire Division** were on hand to observe the employment of welded wire fabric to reinforce the asphalt pavement at bus stops on the Square. The occasion marks the first time this most modern development in road construction has been used by a community in Ohio.

★ ★ ★

This modern approach to asphalt road construction employs sheets of welded fabric 8½ x 9½ feet, which are imbedded in the 1½ to 2½ inch layer of asphalt.

★ ★ ★

The reinforcement binds the mixture together so as to offer maximum resistance to the expanding effect caused by winter cold and summer heat as well as cracking, washboarding and disintegration caused by the traffic.

★ ★ ★

Present to observe the installation of the new roadway, were besides the Mayor, **Walter F. Munford,** president, **Norman M. Sted,** Cleveland District sales manager, and **M. E. Capouch,** manager of construction material sales, representing American Steel & Wire Division of United States Steel Corp., which manufactures the wire mesh being used in the project.

★ ★ ★

Welded wire fabric reinforcement of asphaltic concrete resurfacing was first used on a strip of roadway in Texas as early as 1946. Since that time, however, a number of communities and state highway departments, including

International Wire Products Corp.

Midland Park, N. J.

Fabricators of copper, stainless, monel, and steel strands and cables in the fine sizes.

We invite special constructions for experimental cables and strands —for use in Engineering Department work.

We specialize in strands and wire for the costume jewelry trades— Gold colors and silver color strands and wires.

Our facilities include wire drawing, tinning and stranding of single end and multiple wires.

Strand annealing furnace for monel, stainless and silver plate wires —including phosphor bronze and brass from .040 to .002 fine sizes.

Minnesota, New Jersey, Illinois, Indiana, and the District of Columbia have installed sections of this modern roadway which have been revealing remarkable resistance to the wear and tear of trucks and busses.

Announces Deferred Payment Plan for Industrial Furnace and Air Conditioning Equipment

Surface Combustion Corporation, Toledo 1, Ohio, announces that it has established a deferred payment plan for the purchase of the industrial equipment manufactured by its industrial divisions.

★ ★ ★

The new Surface plan is believed to be the first formal arrangement for the financing of large size industrial furnaces and air conditioning equipment. The products covered by this plan include furnaces for the metalworking and producing industries and the glass industry. Also covered is the company's Kathabar humidity conditioning equipment, used for industrial processing and personnel comfort.

★ ★ ★

The plan provides for terms of payment up to three years and, in certain cases, up to five years. Down payments are normally 25% of the purchase price of the equipment. Financing charges are 6% simple interest on the unpaid balance.

★ ★ ★

Probably the most important feature is the fact that the cost savings afforded by new equipment, such as heat treat furnaces, often permit paying for the equipment over the financing term.

Oliver I & S Appointments

Paul H. Startzman has been elected executive vice president, **Oliver Iron & Steel Corp.,** Pittsburgh. He was formerly vice president-operations. **L. E. Uhrich** was elected secretary and assistant treasurer to fill the vacancy created by **James C. Beech,** resigned. **James H. Mayberry** has been elected assistant secretary and controller, and **Henry V. Blaxter Jr.** elected a member of the board.

Engineer Joins Facile

As part of its current expansion program, Facile Corporation, 185 Sixth Ave., Paterson 4, N. J., manufacturers of reinforced laminated materials for the decorative and industrial trades, announces that **Robert W. Miller** has joined the production staff as an industrial engineer.

★ ★ ★

Mr. Miller's duties will cover production and plant layout work. He was formerly with S. E. & M. Vernon Co., Elizabeth, N. J., as production manager.

The 1954 Edition of the

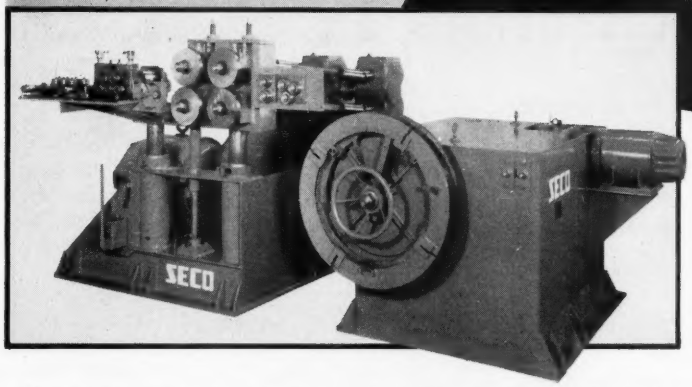
WIRE AND WIRE PRODUCTS BUYERS' GUIDE

IS ON SALE.

Outstanding Features Superior Performance

NEW Heavy Duty COILER for Electrode Wire

DOES ALL THESE OPERATIONS



1 - STRAIGHTENS 2 - MEASURES 3 - FEEDS 4 - PRECASTS 5 - COILS

This Coiler handles welding wire of 3/32" to 3/8" diameter at 200 to 800 F.P.M. on blocks of 12" to 25" diameter.

Mechanically it consists of two separate units: the first doing the straightening, measuring, feeding and pre-casting of the wire, the second doing the coiling only.

Electrically both units are tied together in as much as all motors are controlled from one VS drive and control unit.

Write for full information and data—or consult our engineers on your coiling problems—no obligation.

- Puts a predetermined cast in the wire prior to its coiling on the block.
- Makes a traverse wound coil which will easily uncoil although being close and tightly wound with no danger of springing open.
- First unit equipped for hydraulically raising or lowering the entire roll assembly for proper lineup with the block diameter.
- Complete control over traverse mechanism for delaying reversal at stroke ends.
- Compact construction with easy accessibility to all moving parts.

STEEL EQUIPMENT CO. 20805 AURORA ROAD CLEVELAND 22, OHIO

SECO

GOOD-BYE, WIRE GUIDE ACHES?

SEE US IN DETROIT AT THE CONVENTION!

DISCUSS YOUR WIRE GUIDE, STEADY REST, BEARING AND BUSHING PROBLEMS WITH US.

PERHAPS SELF-LUBRICATING LIGNUM-VITAE, THE WORLD'S HARDEST . . . HEAVIEST . . . DENSEST WOOD, WILL BE THE ANSWER TO REDUCED SPOILAGE . . . INCREASED PRODUCTION . . . LESS BREAKDOWN TIME . . . LOWER COSTS.

WE'LL GLADLY FURNISH FREE TESTING SAMPLES.

Check the desk at the Hotel Statler for our room number . . . and see

SAM E. GOLD
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LIGNUM-VITAE PRODUCTS CORPORATION
90 BOYD AVENUE • JERSEY CITY 4, N. J.

Serving Industry with Self-Lubricating Products Since 1890

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CRITICAL CUSTOMERS

For the past ten years we have specialized in the compounding of Vinyl extrusion and injection molding compounds to specifications, or developing compounds for a specific use.

Underwriters' approved standard compounds are available in all colors for POT, T, TW, 80 Degree C, 90 Degree C and 105 Degree C wires.

If you require a Vinyl compound rated higher than 105 degrees C for special applications, we suggest you communicate with us, as we may have a compound to meet your requirements.

Your inquiries are invited.

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STATEMENT OF THE OWNERSHIP, management, and circulation required by the Act of Congress of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 233), of WIRE AND WIRE PRODUCTS, published monthly at Jersey City, New Jersey, for year, 1954.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, Richard E. Brown, 453 Main Street, Stamford, Conn.; editor, Edmund D. Sickels, 453 Main Street, Stamford, Conn.; managing editor, none; business manager, Ruth S. Spengel, 453 Main Street, Stamford, Conn.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.) Quinn-Brown Publishing Corporation, 453 Main Street, Stamford, Conn.; Richard E. Brown, 453 Main Street, Stamford, Conn.; Leta B. Brown, 1045 Summit Road, Montecito, Cal.; Ruth S. Spengel, 453 Main Street, Stamford, Conn.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.)

RUTH S. SPENGEL
Business Manager

Sworn to and subscribed before me this 10th day of September, 1954.

HAZEL R. RANDLETT
Notary Public
My commission expires April 1, 1955

DPR-New Uses in Cable and Communications

(*Continued from page* 1207)

agent, sulfur and the appropiate accelerators. We have found that these ingredients disperse much more readily if they are sifted prior to mixing with the DPR. By making a heavy paste of these ingredients with a small portion of the DPR excellent dispersions are obtained. These masterbatches are then reduced with DPR according to the formula.

★ ★ ★

A typical formulation for a soft self-curing stock would be as follows:

DPR	**100**	**parts**
Sulfur	**2**	**"**
Zinc Oxide	**5**	**"**
Diphenylguanidine	**1**	**"**
Zinc diethyl dithiocarbamate	**1**	**"**

★ ★ ★

This stock may be cured in 2 or 3 hours at from 175°F. to 200°F. or it will self-set at room temperature in about a week.

Hard rubber stocks would have the following general formula:

DPR	100	parts
Sulfur	50	"
Silica	50	"
CaO	10	"
Di-ortho-tolyl-guanidine	1.5	"

★ ★ ★

In conclusion I should like to say that while the Hardman Company has been producing DPR for over 20 years it is only recently that it has been made commercially available. Thru our long experience in compounding DPR we have built up a partly complete file of formulations to meet most requirements.

★ ★ ★

We have learned to recognize both the advantages and limitations of our product.

★ ★ ★

The main points I want you to remember are: That DPR itself is nothing but natural rubber in flowable form. That to be useful in most cases, it must eventually be cured. In the case of the #46 compound, there are just enough of the essential curing ingredients added to cause it to self-cure to the gummy state. And finally, that DPR contains absolutely no solvents or water—it is a 100% rubber.

★ ★ ★

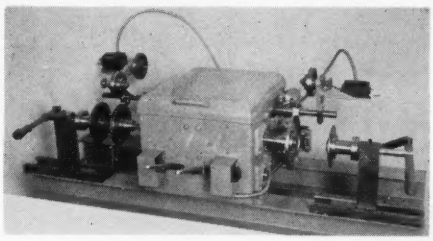
Flowable DPR compounds are doings things in the cables and communications industry that can't quite be done with anything else.

Cooling of Steel Wire During Continuous Drawing

(*Continued from page* 1169)

p. 21-30 (Iron and Steel Institute Translation Series 99).

2. "Temperature and Energy Conditions When Drawing Through Multiple Dies" by Werner Lueg, Stahl und Eisen, 1943, Vol. 63, Feb. 11, p. 113-114 (Iron and Steel Institute Translation Series 150).
3. "The Measurement of Surface Temperatures," Part I, by M. W. Boyer and J. Buss, July 1926, Industrial and Engineering Chemistry.
4. "The Measurement of Surface Temperatures," Part II, by F. W. Adams and R. H. Kean, August 1926, Industrial and Engineering Chemistry.
5. "Back Pull Wire Drawing" by Dartrey Lewis and Howard J. Godfrey, October 1949, Wire and Wire Products.
6. "Fan Engineering," Fifth Edition.
7. "The Making, Shaping and Treating of Steel," Sixth Edition.



THE BOYD
Model 6025
SPOOLER
PRECISION ENGINEERED

The Boyd 6025 spooler is a precision engineered unit available with one or two spindles.

The traverse mechanism is a single screw, solenoid actuated for positive "no-dwell" reversing which runs in a constant shower of oil.

Traverse lengths are readily adjustable from one-half to eight inches, or longer if desired in a matter of seconds with the machine in operation and can be made for larger spools where customer requirements demand lengthier traverse. Infinite rates of traverse for varying sizes of materials are achieved through easily applied change gears over a great range.

The main housing is of all steel welded construction with cast aluminum cover of drip-proof design. All wear points are protected with anti-friction ball bearings to further enhance the rugged, long-lived features of this machine.

Auto-stop motion at predetermined footages is included as standard equipment on each individually operated spindle along with manual clutch release for emergency stop.

Special power equipment for constant speed or smooth slow starts is available and easily adapted to your needs. Quick release tail stocks can be had as either hand or foot operated while spool adapters can be supplied to cover your entire range of finished package spools.

Send for Full Particulars

BOYD & SONS MANUFACTURING CO.

1434 CALLOWHILL ST. **PHILADELPHIA 30, PA.**

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WET OR DRY LUBRICANTS

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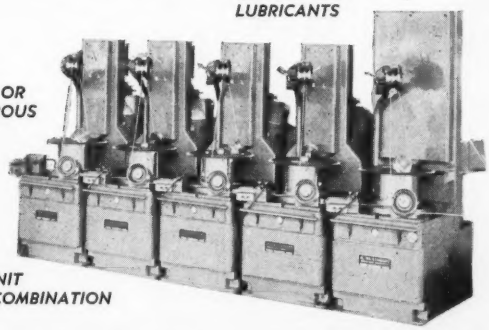

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PITTSBURGH, PA.

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Bulletin Describes Features of New Transmission Belt

Poly-V drive, **Raybestos-Manhattan's** new concept of belt power transmission is described in a colorful new brochure #6638 just issued by the **Manhattan Rubber Division,** Passaic, N. J., developers of the new belt and V-grooved sheave. Design characteristics of the single, endless belt with molded lengthwise ribs, are explained in two-color line-drawings that show why fourteen specific advantages are claimed for the drive.

★ ★ ★

The brochure uses V-belts and sheaves as a standard for comparison of Poly-V with conventional drive. Text and line drawings explain in detail why the drive gives twice the contact area, 50% more horsepower, eliminates matching, reduces face pressure, maintains constant effective pitch diameter under shock loads, allows shorter centers, and reduces inventory of both belts and sheaves.

★ ★ ★

Offer of engineering service and data to help solve existing drive problems is also made in the eight page folder.

New Soldering Flux for Iron and Steel

Industrial Craftsmen, Inc., 145 High Street, Boston, have just announced the development of Poly-Flux, a liquid flux especially formulated to make solder flow and hold on iron and steel as easily as on copper, bronze, zinc, etc. Without resorting to harsh chemicals, Poly-Flux thoroughly removes surface oxides. Tests indicate that joints soldered on iron and steel with Poly-Flux and solid solder with a regular soldering iron, or by the flame or dip methods, are as strong as the solder itself. The flux comes in 2 oz. containers and descriptive literature will be sent to all who request it.

Scovill Making Stainless Snap Fasteners

Scovill Manufacturing Company, Waterbury, Conn., has announced that it is the first to produce snap fasteners of stainless steel—"a goal the industry has been trying to achieve for years."

★ ★ ★

The new closure has been added to the firm's line of "Gripper" snap fasteners. According to the company, "this new product reflects the company's policy of working with customers in developing special closures to meet special conditions in service." Research indicated that the use of stainless steel would meet new specifications submitted by customers. The production problem of producing a fastener made of this alloy was then worked out.

Carboloy Appoints Manager of Manufacturing Engineering

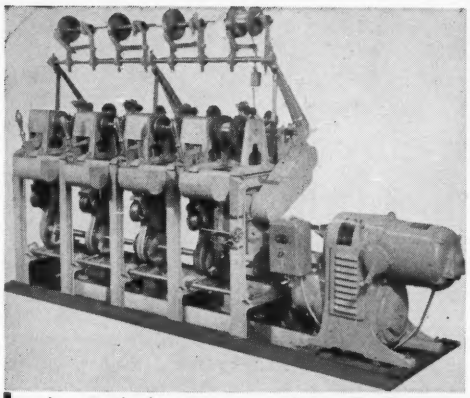
Robert L. Bell, formerly superintendent of metals, **Carboloy Department of General Electric Company,** has been appointed manager of manufacturing engineering.

★ ★ ★

Prior to coming to Carboloy in 1939, Mr. Bell was affiliated with Bates & Rogers Construction Co., and the Carboloy component of the Cleveland Wire Works. He holds a B. S. degree in civil engineering from Swarthmore College. His graduate work at Case Institute of Technology was in metallurgy.

Victor Equipment Expanding

Victor Equipment Co., 840 Folsom st., San Francisco 7, Cal., is expanding its Alloy Rod & Metal Division. Construction has started in Whittier, Calif., on a 6000-sq-ft plant for the manufacture of hard-surfacing alloy rods. A furnace will be ready for installation when the construction of the building is completed. Another 15,000-sq-ft building will be built when initial construction is finished in October. No definite date to move from its present Lynnwood, Calif., plant have been announced yet, according to **Jack Spence,** vice president in charge of the Alloy Rod & Metal Division.



1900-HV MULTIPLE SPINDLE SPOOLER

SPECIFICATIONS
Size Range: .010" to .080" or heavier if soft and many flat wire sizes.
Max. Spool Size: 16" flange diameter.
Capacity: usually 4 to 8 spindles.

The 1900-HV Spooler is a rigid, precision machine which will consistently produce a uniform, dense wire lay. Both the traverse and spindle drives are regulated through wide-range, stepless, variable speed units, eliminating change gears. The 1900-HV is completely adaptable to your particular constant or changing demands. All controls are positive. Adjustments are made accurately with the spooler in operation and without tools.

Both smooth acceleration and rapid stopping is obtained through a single lever at each station. Spool changing is simple and rapid. Anti-friction bearings are used on all shafting and spindles.

Your special requirements can be incorporated into the design. Each machine is delivered ready for operation from your power supply. Payoff stands furnished as extras.

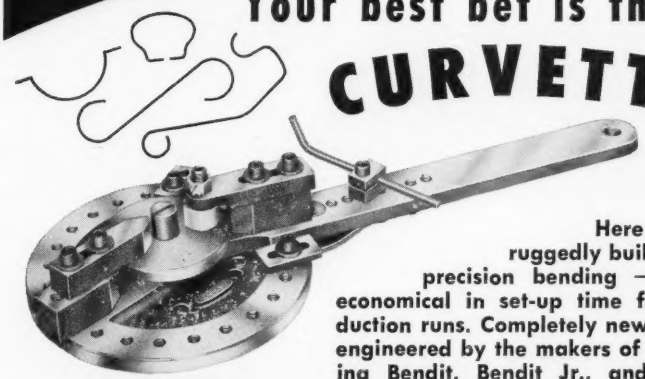
Consult us on your spooling problems.

ROBERT J. EMORY COMPANY
31 East Runyon Street Newark 5, N. J.

If you answer YES to these two questions—

1. Do you form Wire, Strip, Bar, Angles, Channel or Tubing?
2. Are short production runs a bottleneck in your plant?

Your best bet is the NEW CURVETTE



Here is a simple, ruggedly built machine for precision bending — particularly economical in set-up time for short production runs. Completely new, but soundly engineered by the makers of the outstanding Bendit, Bendit Jr., and Curvit. The CURVETTE is a tool every shop can afford. Bends ¼" basic wire into almost any shape you desire. Takes strip up to ¾" by ⅛". Write for full details.

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PRECISION MACHINES FOR THE METAL WORKING INDUSTRY
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Cost-Saving QUALITY
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Quality standards at Webb Wire have enabled customers to reduce their inspection time on some wires by as much as 75%. You can rely on Webb for quality, as well as speedy service—overnight in some cases. Prompt attention and equal care are given to small as well as large quantity orders. Webb specializes in supplying these kinds of fine wire:

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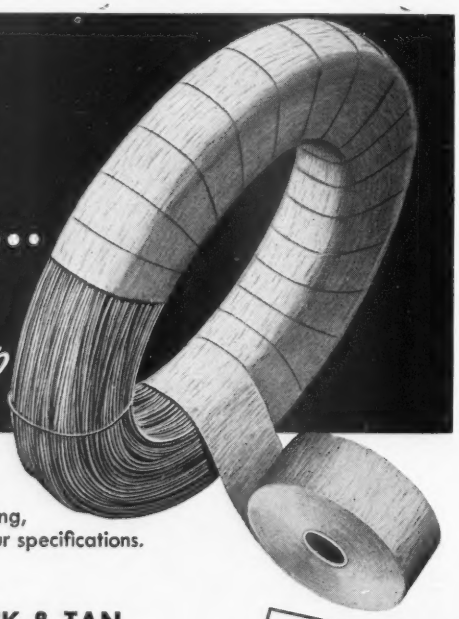
- ✓ WEBB STAINLESS SPRING WIRE
- ✓ WEBB HIGH CARBON WIRE
- ✓ WEBB SPECIALTY STAINLESS WIRE

Write for our booklet, "A Look at Wire Making the Webb Way", at no obligation.

WEBB WIRE DIVISION

The Carpenter Steel Company • New Brunswick, N. J.

for TIGHTER ALL-ROUND PROTECTION... use NATCO Spiral Wrap



Strong, with a built-in stretch, NATCO's contour-hugging spiral wrap is superior for wire coils, tubing, metal rods and bars. Made to your specifications.

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- GREASEPROOF • REINFORCED
- ANY SIZE ROLL—*for machine or hand-wrapping*

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108 Beckett Street, Camden 3, N. J.

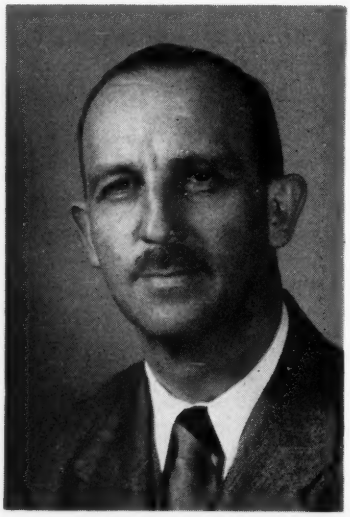
Larmuth power wrapping machines or special tension and edge-folding attachments for your machines.

Establishes Consulting Office

LeRoy D. Seymour, well-known throughout the wire industry as "Jack," has announced that as of October 1, 1954, he has established a Wire Mill Consulting Engineering Service, with offices at 1168 South Olden Ave., Trenton, N. J.

★ ★ ★

His services will include design, engineering, construction, plant layout, mill practice, production control and other related services.



LeRoy D. Seymour * * * *

He recently completed the design and construction of a new wire mill in Bayamon, Puerto Rico, for the Gulf Steel and Wire Co.

★ ★ ★

Jack is a graduate of Pennsylvania State College, from which he received a degree of B.S. in Metallurgy. He has held a number of important posts in wire mills, was formerly a director and a president of The Wire Association, and has written a number of technical papers, for one of which he received the Medal Award in 1942, for the most meritorious paper on wire manufacturing during the year.

Bristol Company Bought By American Chain & Cable

The Bristol Company of Waterbury, Conn., well-known manufacturer of industrial instruments, has been purchased by **American Chain & Cable Company, Inc.**, Bridgeport, Conn., according to an announcement by the Bridgeport concern.

★ ★ ★

The sale, amounting to about $7,600,000, was consummated through the purchase of virtually all of the outstanding stock.

★ ★ ★

The Bristol Company was bought because of its good growth possibilities in this era of automatic controls in many industries. It maintains 27 branch offices, branch factories in Chicago and San Francisco, and has a Canadian subsidiary.

★ ★ ★

No changes in management, personnel or policy are contemplated. The company is in a strong financial position and an expansion program undertaken some years ago will be completed in 1955.

★ ★ ★

A landmark in Waterbury industry, the Bristol Company was founded in 1889 to manufacture the inventions of **William H. Bristol** and has pioneered many automatic control instruments now considered basic by American industry. Present-day products include devices for automatic controlling, recording and telemetering temperature, pressure, vacuum, draft flow, pH, liquid depth, humidity, voltage, current, power, motion and speed.

★ ★ ★

In 1913, the company recognized the need for a better socket screw and developed the Multiple Spline Socket Screw which is used by hundreds of industries and machine manufacturers today. It also manufactures a line of Hex Socket Screws.

★ ★ ★

The American Chain & Cable organization, composed of 16 divisions, manufactures more than 100 industrial products including valves, gauges, and Rockwell

Scott Testers* make One World – break the language barriers – speak a world tongue

WE SHIPPED A TESTER TO A BRITISH FIRM'S BRANCH IN THE U.S.A.

Soon we got an order from them to send a similar machine to England; then to New Zealand; then to South Africa; then to Canada.

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we shipped several machines; shortly they ordered duplicates sent to Italy.

TO A DUTCH FIRM'S U.S.A. BRANCH

we shipped a range of equipment; next thing we knew, in came their order to ship a set-up to Holland.

Pounds or kilos . . . Scott Testers* put you in intelligible communication with any firm anywhere, whether it's to test wire, plastics, rubber, metal strip or constructions, up to 1 ton or 1,000 kilograms tensile. Methods and results conform to ASTM, ISO and other recognized specifications.

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SCOTT TESTERS, INC.

55 Blackstone Street
Providence, R. I.

*REGISTERED TRADEMARK

speed up your production with

SHEFFIELD manufacturers wire

Sheffield Manufacturers Wire is drawn from steel made from furnace to finished product in Sheffield's own mills. Quality is checked and guarded at every step. Perfect uniformity and accuracy of gauge are assured, for greatest efficiency in your operation.

Sheffield is prepared to serve your needs quickly for manufacturers wire in any quantity. Get in touch with your nearest Sheffield office.

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SHEFFIELD STEEL CORPORATION

HOUSTON, TEX.

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WIRE DRAWING LUBRICANTS

FOR ALL TYPES OF FERROUS AND NON-FERROUS METALS

WET OR DRY DRAW

Typical Wet Machine for Drawing Operation

You can improve your wire quality and increase your drawing efficiency by

USING "ALBANY" PRODUCTS

Our Engineers are prepared to assist you.

1868 — ADAM COOK'S SONS, INC. — 1954

LINDEN • NEW JERSEY

OTHER ALBANY PRODUCTS ARE DESIGNED FOR TUBE DRAWING AND OTHER METAL WORKING OPERATIONS

LINÉ-GORCY

MECHANICAL

WIRE ROD DESCALERS

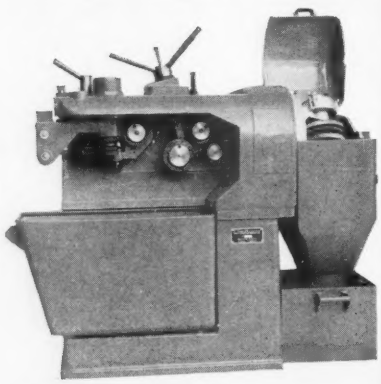
(Patented in U.S.A.)

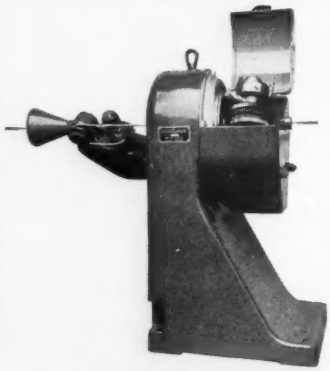
Users acclaim them—

RUGGED!

EFFICIENT!

LOW IN COST!





Hundreds of these machines are giving excellent records in low cost effective dry cleaning of hot rolled steel wire rods—here and abroad!

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hardness testers. Its consumer products include Pennsylvania lawn mowers, Weed tire chains, and Page fencing.

Methods of Reasoning

"Methods of Reasoning" a booklet containing an approach to the scientific method. In condensing, popularizing and clarifying the method, the author has made the entire technique of problem solving and decision making immediately available to the reader.

★ ★ ★

The Dark Ages were broken by such thinkers as Bacon and Descartes, but only here has the gist of all this 300 and more years of method investigation been reduced to such a highly usuable form.

★ ★ ★

The work of the logicians, scientists, philosophers and theologians has been crystallized and fitted together to create a pattern for answering today's problem solving needs.

★ ★ ★

Starting with a definition of reasoning, the booklet sets forth the concept of the sensed difficulty, techniques of establishing the problem and how to state the approach and the method of arriving at sound solutions.

★ ★ ★

The author, **P. D. Scott,** has had 25 years experience in training engineers and technical personnel. He has been a member of the Board of Governors of the **Cleveland Engineering Society** and has held numerous chairmanships within the organization.

★ ★ ★

An engineer with the Ohio Bell Telephone Co., Mr. Scott has drawn upon his background, upon his study and investigations of the past 20 years, and upon the lore of the ancient philosophers, in this treatise.

★ ★ ★

"Methods of Reasoning" is available from the Publications Office, Cleveland Engineering Society, 2136 East 19th St., Cleveland 15, Ohio, for one dollar a copy.

Two New Technical Reports on "Mylar" Film

Two new technical reports concerning "Mylar" polyester film—one covering the film's physical, chemical, and electrical properties, and one on adhesives developed for bonding "Mylar" to other materials—have been issued by the **Du Pont Film Department.**

★ ★ ★

The report on properties (TR-1) contains revised, up-to-date information, complete with charts, diagrams, gauges, and tables. In addition, the report provides a detailed table on the film's physical properties, which are compared with those of other Du Pont films—cellophane, polyethylene, and acetate.

★ ★ ★

A special section also gives complete information on the film's electrical properties: dielectric strength, insulation resistance, volume and surface resistivity, etc. Among other information, the chemical properties section points out the film's tensile strength and tear resistance on exposure to solvents, acids and other chemical reagents.

★ ★ ★

Information contained in the report on adhesives (TR-2) was supplied by adhesives manufacturers. Listed in detail are the adhesives recommended for bonding "Mylar" to other films, foils, papers and metals. Also listed is a directory of adhesive suppliers, as well as adhesive code names and colors.

★ ★ ★

Copies of technical reports TR-1 and TR-2 may be obtained from the Du Pont Film Department, Wilmington 98, Delaware.

Results of Research on Plastic Coatings for Wire Reported

Results of a study were reported recently before the Convention of the American Chemical Society may point the way to improvements in the durability of nylon and other plastic materials for communication cable covers.

★ ★ ★

The Nelson Company

manufacturers of quality reels for the wire industry for over twenty-five years, congratulates

The Wire Association on its Silver Anniversary

THE NELSON COMPANY

Standard Oil Building — Baltimore 2, Maryland

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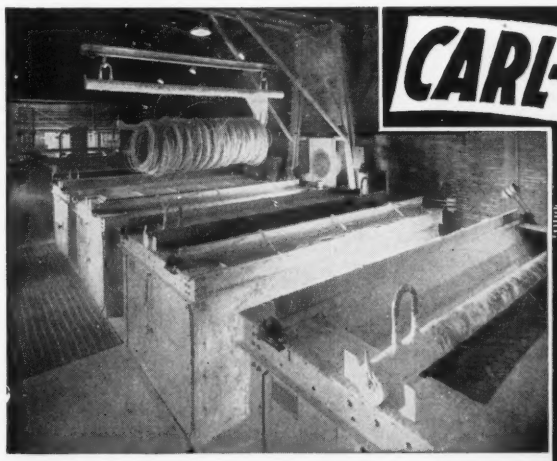

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ROD BAKERS

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ALSO OTHER TYPES OF INDUSTRIAL OVENS AND FURNACES

GREATER SPEED AND FUEL ECONOMY PROVES OUTSTANDING ENGINEERING

Carl-Mayer Hi-Speed Rod Bakers have an exclusive heating arrangement, combining faster baking with amazing fuel economy—and a patented Blow-Off feature which removes moisture without bumping or agitating the coils. *WRITE FOR BULLETIN NO. 350.*

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Colorado Fuel & Iron Corp.
Crucible Steel Co. of America
Eaton Manufacturing Co.
Frost Steel & Wire Co., Ltd.
B. Greening Wire Co., Ltd.
Gary Screw & Bolt Division of Pittsburgh Screw & Bolt Corp.
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Expanding application of twisting principles to the production of many products is reflected by an ever-increasing demand for both H-D standard equipment as well as machines especially engineered to solve varied production problems. Week after week surprising new uses are developed through the close cooperation of our engineering department with manufacturers in many fields.

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PHILADELPHIA 34
PA.

The study described in a paper on "The Natural and Artificial Aging of Nylon", was conducted at **Battelle Institute,** Columbus, Ohio, under the sponsorship of the **Coles Signal Laboratory,** branch of the United States Army Signal Corps.

★ ★ ★

After prolonged exposure to the weather, it is known that plastic cable covers tend to become brittle and lose tensile strength. The Battelle study attempted to correlate this "outdoor aging" process of plastic materials, particularly nylon, with similar aging that can be achieved under accelerated conditions in the laboratory.

★ ★ ★

Basic results of the outdoor phase of the study were obtained by exposing specimens of four types of nylon to the elements at five different geographical locations for eighteen months. These locations represented many different types of climates, ranging from arctic to tropical. A comprehensive record of weather factors at the various locations was maintained to determine the elements of climate that contributed most to the deterioration of the nylon specimens.

New Insulating Materials Standards to be Published

International agreement has been reached on revision of the classification of insulating materials which was published in the 1935 Edition, Rule 34 for rotating machines and transformers, issued by the **International Electrotechnical Commission.** This agreement was reached by national committees of 13 countries that are members of a Technical Committee of the IEC. The committee met in Philadelphia during the 50th Anniversary Celebration of the IEC, September 1-16.

★ ★ ★

It is proposed to publish the new classification as a separate document applicable to all types of machinery and apparatus. In addition to the previous standards covering classes A, B, and C, new

HAVEG PICKLING TANKS
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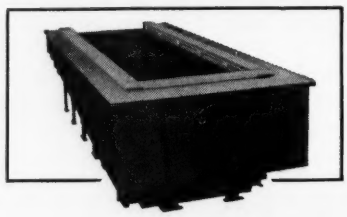

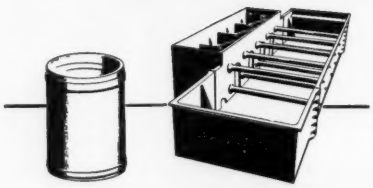

• Molded into any size or type
• Superior corrosion-resistance

Haveg round or rectangular tanks effectively resist most acids, salts, chlorine and many solvents—even in boiling temperatures as high as 265° F., with a good margin of safety. Haveg is not a coating or lining, but a corrosion-resistant constructional material that can be molded into large, seamless tanks. Such tanks are extremely tough, durable . . . resist thermal shock, will not contaminate product-finishing. In every way, Haveg can be "custom-engineered" to fit your requirements: Tanks, pipe, valves, fume duct, heat exchangers, pumps, agitators.

Learn how Haveg can help you combat corrosion, improve production . . . call in a Haveg sales engineer, or write for 64-page Bulletin F-6.

Send for 64-page Bulletin F-6. It contains complete information on Haveg pipe, fittings, valves, pumps, cylindrical and rectangular tanks, heat exchangers, and other corrosion-resistant process equipment. Call your Haveg sales engineer for first-hand facts.

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MIL-W-5086 WAS QUITE A PROBLEM

In fact it was three times a problem. We had to satisfy the Military Specification (which is MIL-W-5086). Then we had to satisfy the manufacturer of the wire. And finally there was the ultimate user of the wire who knew what he wanted —and demanded just that.

The story went like this:

MIL-W-5086 is a Military Specification covering aircraft electrical wire. To satisfy it our job was to develop a NELCO cable coating which would have abrasion resistance, fungus resistance, flexibility at temperatures as low as —55 degrees C. and, finally, be resistant to many liquids used in and around aircraft.

Specifically, the aircraft builder required the NELCO cable coating to withstand the hydraulic fluid that occasionally gets loose in a plane and causes serious damage to wire lacking a proper protective coating.

And, of course, the wire manufacturer had to have a cable coating which could be easily applied.

We turned this many sided problem over to our competent laboratory staff.

We don't say it was the same day they came up with the perfect cable coating but they did have it in a comparatively short time.

The above problem is typical of what our laboratory must face in preparing NELCO cable coatings for every conceivable condition.

Watch this column for more information on cable coating problems we have met and solved.

. . . and if you've found something of interest here, we'd like to hear from you.

NEW ENGLAND LACQUER CO.

150 King Philip Rd., East Providence, R. I.

classes named E, F, and H will be included. Maximum operating temperatures will be assigned to the various classes, which will be defined in broad terms,

★ ★ ★

An appendix listing materials in their various classes will be divided into two parts: **(a)** a principal list which will apply to well established materials, and **(b)** a supplementary list which will apply to lesser known materials.

★ ★ ★

The new document now will be submitted to the various national committees that are members of IEC Technical Committee 2 for approval.

"Price Fixing, Controls, and Allocation of Non-Ferrous Metals"

Most economists, industrialists, and businessmen will agree that controls may become unavoidable in time of war. However, controls when adopted, exert an often unpredictable, but always damaging effect on the delicately adjusted mechanism of the free enterprise economy. Frequently they do not achieve the results sought. Worse, they sometimes produce effects which are positively harmful to the national emergency effort they are invoked to support.

★ ★ ★

In a 37-page study **W. F. Boericke,** well-known metals consultant associated with **Hayden Stone & Co.,** has analyzed what happened when price fixing, controls and allocations were adopted for a basic United States industry—the production and processing of non-ferrous metals. The study is devoted to the problems of the copper, lead, zinc, aluminum, and tin industries, with major attention to the first three.

★ ★ ★

Mr. Boericke discusses various government wartime controls for non-ferrous metals. The effects of the Premium Price Plan of 1942 are outlined. The basic concept of this plan was to pay a premium price for output above a quota to get quantities otherwise unobtainable at competitive prices. At the

BUNCHING (TWISTING) AND STRANDING IN THE WIRE AND GENERAL MANUFACTURING PROCESSES

SPECIALIZED ENGINEERING AND SPECIALIZED FACILITIES AT YOUR SERVICE

Expanding application of twisting principles to the production of many products is reflected by an ever-increasing demand for both H-D standard equipment as well as machines especially engineered to solve varied production problems. Week after week surprising new uses are developed through the close cooperation of our engineering department with manufacturers in many fields.

Write today for our New Technical Bulletins. Tell us what you make—or contemplate making and your inquiry will receive prompt attention.

HASKELL-DAWES MACHINE CO., INC.

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(TWISTING)
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IN THE WIRE AND
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HASKELL-DAWES
MACHINE CO., INC.
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PA.

same time, low-cost producers were not to have more than an established ceiling price. The practical effect was to divert scarce miners and equipment to small high-cost mines where the output per man was necessarily low. As a consequence, total output was less than it otherwise could have been. Although marginal mines were brought into production, the plan developed no new sources of ore competitive under normal conditions.

★ ★ ★

According to the author, controls imposed during the Korean War marked by disregard for weakness of a dual price system, disregard for cost-price relationships and disregard for the effects of foreign trade.

"Price Fixing, Controls, and Allocation of Non-Ferrous Metals" is one of a number of related studies of the effects of government controls published by the **American Enterprise Association** in accordance with its policy of making available information and analyses of subjects of public importance.

Anaconda Revises Magnet Wire Section of General Catalog

An up-to-the-minute catalog on magnet wire, highly detailed, has just been issued by **Anaconda Wire & Cable Company** in the first major revision to its General Catalog No. C-79 since that book was brought out late in 1951. Since that time the General Catalog has been widely distributed and bids fair to become the "bible" of the industry.

★ ★ ★

Designed to replace "Section 12" in the General Catalog itself, the new revised section on Magnet Wire also is available as a separate book, 84 pages long and designated "C-79-12". Sub-sections deal with high temperature magnet wire insulations.

★ ★ ★

Section 12 is conveniently indexed, and profusely illustrated with extremely readable charts, tables, drawings and photographs.

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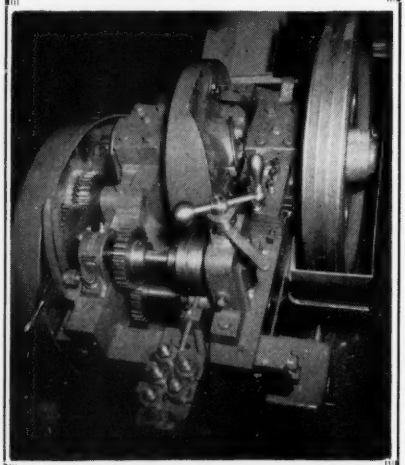
PER MINUTE!!!
are made on the
HUMPHREY
STAPLE MACHINE



Top View, showing Fly Wheel & Gears

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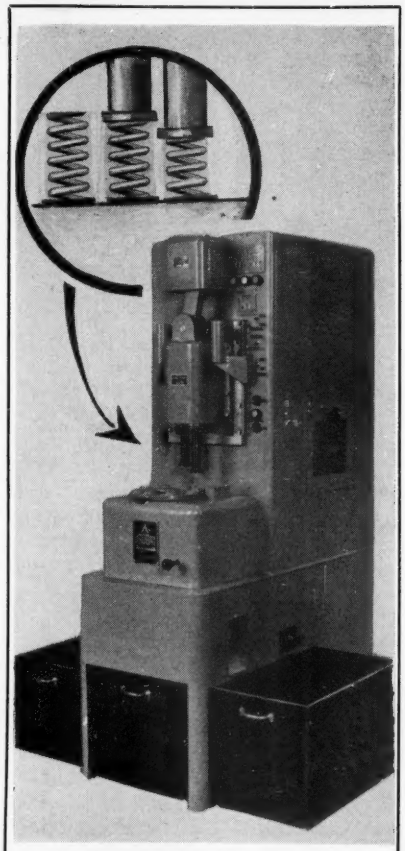

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SPRING TESTING EQUIPMENT

AUTOMATIC Testing combined with scragging and counting or HAND OPERATED testers, for laboratory or production control.

MASS or SINGLE testing, whatever and wherever testing problems arise, contact the PROBAT specialists, because it pays back.

PROBAT equipment is tailor made

Spring Testing Machines ranging from 1 lb. up to 60 tons and more. Specialists for torsion testing.

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It opens with general, but original, comment on copper and aluminum magnet wire. The sub-section following details data on round magnet wire, square and rectangular magnet wire.

★ ★ ★

The concluding section, "Technical Data" contains all necessary, pertinent information on formulae, trigonometric functions, some helpful recommendations on packaging, storage and handling; effect of humidity on insulations, etc.

★ ★ ★

All in all, an A-1 job that the buyer and/or specifier of magnet wire has needed since ASTM & NEMA standards revisions set him adrift in some areas. Manufacturers of electrical components, in particular, will wish to write early to E. Fred Luna, Director of Sales Promotion, Anaconda Wire & Cable Co., 25 Broadway, New York, for their copy of the newly revised Magnet Wire Section.

New Great Falls, Montana Aluminum Mill of Anaconda W&C Nears Completion

Anaconda's advent into the aluminum field has obliged its important fabricating subsidiaries to expand rapidly to meet growing markets. This has been particularly true of **Anaconda Wire & Cable Company,** which has expanded in all of its mills to equip itself for manufacture of aluminum products. Its most important facility is the new aluminum rod rolling and fabricating plant under way since last March in Great Falls, Montana.

★ ★ ★

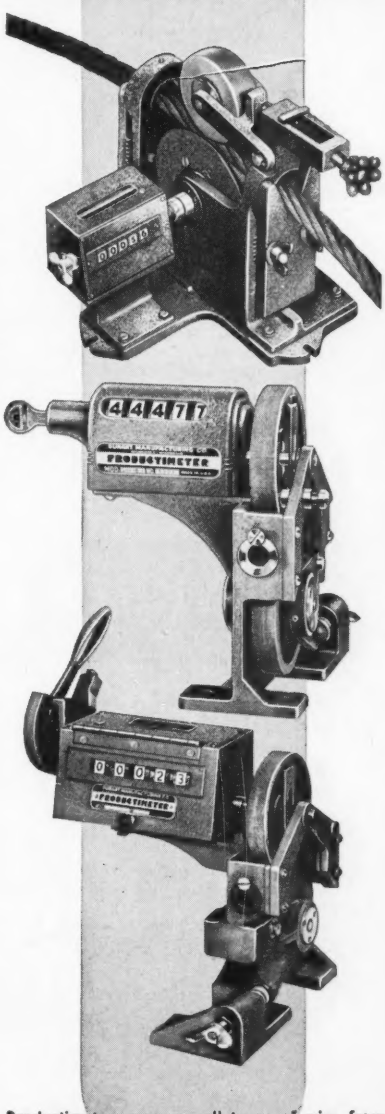
A million-dollar aluminum rod rolling mill will be housed in the plant. It is designed for automatic rolling of aluminum rods. Schedules call for it to be in operation early next year.

★ ★ ★

In addition to the rod rolling mill, wire drawing and stranding equipment of the latest design and valued at another million dollars will be used for production of high quality bare aluminum and strand.

★ ★ ★

PRODUCTIMETER
WIRE MEASURING MACHINES
Fast . . Accurate . . Dependable . . Legible



Productimeters measure all types of wire from .010 to 1½ inches in diameter . . . at speeds up to 5,000 feet per minute. They eliminate "guess-work". . . insure profitable operation in your plant.

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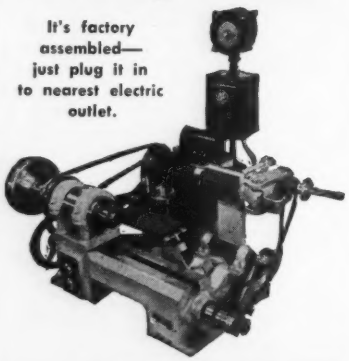
START SAVING
in your Die Finishing Rooms

Double your Refinished Tungsten Carbide Die Production
CUT labor costs 1/2 with the New type "M" automatic

DYKREX
"IT CORRECTS THE DIE"

Polishing Machine

It's factory assembled—just plug it in to nearest electric outlet.



ROOS TOOL & MFG. DIVISION
Dykrex Corporation of America
manufacturers of
Wire Die Finishing Machinery
33 Bloomfield Avenue
Newark 4, N. J.
Western Union
Teletype Service
QAB-WUX—Montclair, N. J.
The Standard of the Wire Industry

The company has been producing aluminum wires and cables at Great Falls for more than two years. The present expansion, it is hoped, will keep pace with requirements for these products widely used by public and private industry, particularly electrical utilities.

★ ★ ★

The new aluminum facility at Great Falls will be the only both full-fabricating and semi-fabricating unit within the Anaconda Wire & Cable Co. "family." Bars will be delivered from the Anaconda Aluminum Co.'s reduction plant at Columbia Falls, 300 rail miles away.

New York Thruway To Get Million-Dollar Wire Fence

A Thruway Authority spokesman confirmed that a 150-mile $1 million fence will line both edges of the Thruway in Ontario, Monroe and Genesee Counties.

★ ★ ★

He said the fence would be designed to keep animals off the highway, and drivers on it. The "hog-wire" fence will be four feet high. The fence will be used only along those stretches of the 535 miles of the complete Thruway where it is needed.

New Screw-Lock Insert Shown at Metal Show

The completely new locking fastener designated as the screw-lock insert by its manufacturer, the Heli-Coil Corp. of Danbury, Conn., was shown and demostrated for the first time at the National Metal Show in Chicago.

★ ★ ★

The screw-lock insert was developed as a companion product to the standard wire thread insert. Both are made of precision-formed stainless steel wire having an ultimate tensile strength of about 200,000 psi.

★ ★ ★

Three important functions are performed by the new screw-lock insert: (1) it automatically locks the screw so that it is vibration-proof, ending the need for lock washers, locking wires or lock nuts; (2) it provides a high-

STANNOUS SULFATE

Saves Tin!
in liquor finishing operations
because

M & T Stannous Sulfate — a manufactured chemical— saves tin by doing away with many of the inefficiencies which accompany the treating of feather or flake tin to produce stannous sulfate on the job.

More convenient to use, too!
Baths are operable as soon as materials are dissolved. Solutions can be prepared in advance to produce desired colors and coating thicknesses.

***AND,* additions are made from stock solutions, assuring quick, complete mixing—eliminating any possibility of materials only partially dissolving in the bath—reducing the chances of miscalculating quantities of materials added.**

Use M & T Stannous Sulfate for white or straw-color finishes. Write for technical procedure sheet.

METAL & THERMIT CORPORATION
Chemical Division
100 E. 42nd St., New York 17, N. Y.
Specialists in Tin and Tin Chemicals

strength thread in materials of all kinds; and (3) it automatically locks itself into the parent material without the use of pins, rings, staking, etc.

★ ★ ★

The screw-lock insert can easily be incorporated into otherwise "frozen" designs or production because it requires no more boss material or wall thickness than a conventional tapped thread. It is now in successful use by a leading aircraft company for cowl fasteners and is being actively considered by other aircraft manufacturers for airframe assemblies. The new insert is also expected to interest manufacturers of power tools, air hammers and other equipment subject to vibration, temperature extremes, periodic inspection teardown or frequent interchanging of attachments.

Regional Managers Appointed

Appointment of five Regional Sales Managers for **Glass Fibers Inc.,** was announced by **R. W. Capaul,** vice president and general sales manager of the firm.

★ ★ ★

S. Austin Marquis was made Detroit Manager, supervising sales in Michigan, Ohio, Indiana and Kentucky.

★ ★ ★

Edward A. McCabe was named New York Manager with headquarters at the company's offices in the Chrysler East Building. He will supervise sales in Eastern New York, Northern New Jersey, Delaware, Eastern Maryland and all of the New England States.

★ ★ ★

John B. Banks was appointed Manager of the Philadelphia region, headquartering in Philadelphia, supervising sales in Pennsylvania, Western New York, West Virginia and Southeastern Ohio.

★ ★ ★

Robert E. Simpson was made Atlanta Manager supervising sales in Georgia, Florida, the Carolinas, Virginia, Eastern Tennesee, Alabama, Mississippi, Louisiana, Oklahoma and Texas.

★ ★ ★

First Quality

DIAMOND POWDER

We Believe That . . .

- The finest, properly graded Diamond Powders are more economical to use than paste compounds.
- For very little more in price, you get considerably greater value for your money—in Danforth powders.
- Purity of diamond powders is essential to properly finished diamond dies. Beware of bargain prices!
- Danforth grading is accurate—you get what you order.

COMPLETE RECLAIMING SERVICE

The DANFORTH PROCESS of reclaiming produces powders that are *guaranteed* to be 99% or better pure. Some reclaiming work runs as low as 80%—but never DANFORTH'S.

Write today for information on new & reclaimed powders.

C. W. DANFORTH COMPANY

Established in 1912

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FROM USED WHEELS • HONES • SLUDGES • COTTON WIPINGS • WIRE DIE POWDERS

ALL POWDERS CLEANED, ASSAYED AND GRADED TO MICRON SIZES.

Write or call for additional information

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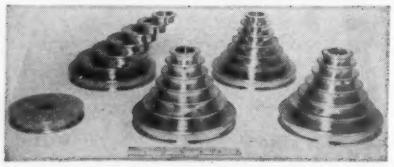
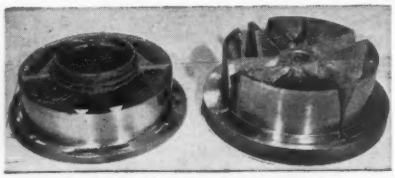


SYNCRO A-16 DRAW RINGS

Pictured at left and below are some wire drawing machine blocks. Many other parts can be hardsurfaced to advantage.

VAUGHN 20" BLOCKS



MORGAN-CONNOR 22" BLOCK

Parts last 3 to 10 times as long as standard equipment—Saves downtime — Cuts wire rejections — Increases production.

OTHER APPLICATIONS

Rollers and Idlers
Sheaves and Pulleys
Steel Crane Wheels
Hot Shear Blades

E T C.

PARKWAY-KEW CORP.

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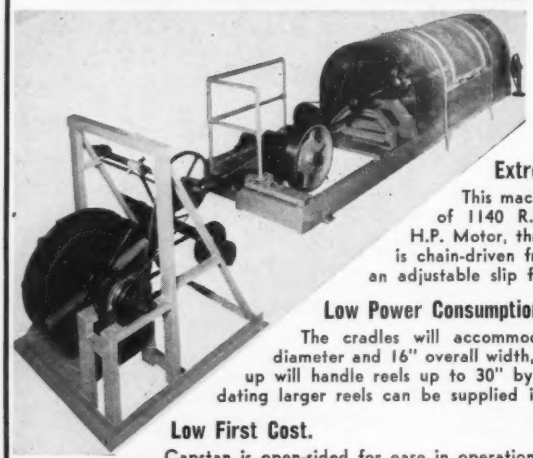
TWO-WIRE TWISTING MACHINE



with LET-OFF, MOTOR DRIVE and TAKE-UP

Extremely High Production.
This machine is built to run at a speed of 1140 R.P.M. The drive is from a 3 H.P. Motor, through a Vee belt. The take-up is chain-driven from the capstan shaft through an adjustable slip friction.

Low Power Consumption.
The cradles will accommodate reels up to 30" in diameter and 16" overall width, while the let-off and take-up will handle reels up to 30" by 16". Take-ups accommodating larger reels can be supplied if needed.

Low First Cost.
Capstan is open-sided for ease in operation.

Large Reel Sizes.
Change gears are standard Boston Change Gears. The Machine will twist a wide variety of wires with lays varying from ½" to 6".

Made in Light and Heavy Duty Types to Handle A Wide Range of Wire Machines.
Overall dimensions of let-off, twister and take-up, set up for operation are 22 feet long by four feet wide. Weight of complete unit is 2300 pounds.

Write for further details of our efficient 2, 3 and 4-wire twisting machines.

THE EDMANDS COMPANY

228 Aborn Street • **Providence 3, R. I.**

Ken C. Settelmyer was named Chicago Manager with the following states under his jurisdiction—Illinois, Wisconsin, Minnesota, Iowa, Missouri, Arkansas, Western Tennessee, Kansas, Nebraska, North Dakota, South Dakota and Upper Michigan.

★ ★ ★

Glass Fibers Inc., has national sales distribution in the 48 states and in all territories of the United States, with manufacturing and fabricating plants located in Waterville, Ohio; Defiance, Ohio; and Burbank, California.

Wirebound Institute Graduating Men This Fall

The ranks of technically trained "Wirebound Engineers" graduated by the unique **Wirebound Institute** are being increased this Fall by 109 more employees of member companies of the **Wirebound Box Manufacturers Association** at graduation exercises in Rockaway, N. J., Chicago, and New Orleans.

★ ★ ★

The graduates will have covered a course of 25 technical lessons in the design, specifications, and testing of wirebound boxes and crates for industry of all kinds and attended in person a series of "clinics".

This Fall's graduations bring to 380 the number of wirebound shipping container industry personnel who have received the technical instruction directed by **Harry A. Wolsdorf** of Package Research Laboratory at Rockaway and **E. F. Gallivan** of W.B.M.A.'s Chicago headquarters. Registrants in the course were recommended or sanctioned by their employers, who received frequent reports of their progress.

★ ★ ★

The Wirebound Institute first presented its course of instruction in 1947. It was repeated starting in 1949. The third presentation started in September 1953.

Appoints Building Wire Specialist

Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., has appointed **J. P. Moran** to the post of building wire specialist in charge

of its national sales program for aluminum building wire.

North & Judd Reelects Directors

Reelection of the present board of directors and top executives have been announced following the annual meeting of stockholders and directors of the **North & Judd Manufacturing Company,** New Britain, Conn.

★ ★ ★

Fred L. Murrow was renamed president: **Thomas DeLoach, Herman M. Frank** and **Vernon Brierly,** vice presidents; **Eugene P. Borkowski,** treasurer; **William H. Judd, Jr.,** secretary; **Fred J. Ward,** assistant secretary and assistant treasurer and **Morgan N. Holmes,** assistant treasurer.

★ ★ ★

Directors in addition to the executives named include: **Harold L. Judd, William H. Judd, Sr., Allan Smith, Arthur E. Thornton, Herman M. Frank** and **Mark J. Lacey.**

Studying Extrusion Methods Abroad

Ben Davis, Director of Sales for **Davis-Standard Sales Corp.,** is on an extended trip abroad for the purpose of studying problems related to the extrusion of plastics and rubber, and the methods used in various European industries. Mr. Davis began his tour on August 19, and expects to remain abroad for about 8 weeks. He will travel through England, France, and other European countries, visiting plants in the electrical wire and cable industry.

★ ★ ★

In addition to affording Mr. Davis an opportunity to view Davis-Standard wire equipment in the field, the trip is expected to provide information that will enable Davis-Standard to improve their methods of design and manufacture, and thus be of greater service to their customers.

Roebling Appoints Engineer

Charles C. Shackford has been named Product Engineer of the Electrical Wire Division of the **John A. Roebling's Sons Corpora-**

PEAK PERFORMANCE with

PERMAG

DRAWING COMPOUNDS

Over thirty years of successful experience with leading wire manufacturers provide the greatest assurance of better production with PERMAG wire drawing compounds.

Formulated in the Magnuson laboratories for guaranteed peak performance, PERMAG compounds consistently prove themselves ideal for all types of wire drawing, for both production and economy.

FOR WIRE CLEANING, too, PERMAG offers a group of completely tested formulas that will eliminate pickling trouble and speed drawing production.

A Magnuson representative will be glad to demonstrate the proven superiority of PERMAG cleaning compounds. Or, if you wish, a letter will bring you a complete analysis of your problem, without obligation.

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New Insulation Tester

• FAULT INDICATOR • COUNTER

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Heavy duty HV Dielectric Test Sets (for tank testing of large reels of wire cable).
Corona Ionization Test Sets.
HV Test Sets, all types: AC, DC, AC/DC.
Spark Testers, Pin hole counters.
Sensitive Hipot Testers.
Bench spoolers.

Demonstrations Arranged

- Continuous production type.
- For non-destructive testing—will not burn or mark wire.
- Combination unit—applies 2 tests simultaneously:
  For "Spark Testing" without marking wire.
  For Pin Hole Detection and Counting.
- Dual test electrodes, detectors, and magnetic counters.
- Adjustable output voltages—0 to 20,000 Volts, AC or DC.

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At Very Attractive Prices

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tion. Announcement of Mr. Shackford's appointment to the Roebling firm's top electrical engineering post was made by **Charles R. Wentz,** Electrical Wire Division Manufacturing Manager.

★ ★ ★

Mr. Shackford joined Roebling in 1935 as a student engineer in the Electrical Wire Division, following his graduation from Lehigh University where he received a B.S. degree in electrical engineering. During World War II, Mr. Shackford served five years with the United States Navy, assigned primarily to projects relating to electronics instruction, research and development, and radar installation and use aboard ship.

Farrel-Birmingham Appoints Assistant Chief Engineer

Farrel-Birmingham Company, Inc., Ansonia, Conn., has announced the promotion of **Philip H. Dreissigacker** to the position of Assistant Chief Engineer.

★ ★ ★

Mr. Dreissigacker first joined the Farrel-Birmingham organization in 1937 following his graduation from M. I. T. with a B.S. degree in Mechanical Engineering. He left the F-B Engineering Department in 1942 for Army service, being relieved from active duty in 1946 with the commission of Major. He then returned to the company in the capacity of machine designer and, in 1952, was appointed Division Engineer of Farrel's Sugar Mill Machinery Division.

New Section Heads are Appointed for Inco's Laboratory

The appointment of three new section heads at the Bayonne Research Laboratory of the **International Nickel Company, Inc.,** has been announced by **Dr. W. A. Wesley,** Manager of the Laboratory.

★ ★ ★

Clarence G. Bieber has been appointed head of the Special Alloys Section; **George R. Pease,** head of the Welding Section, and **W. W. Sellers,** head of the Electrochemical Section.

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for

WIRE

Range of Sizes:

1" long with 5/8" head diam.
up to
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Supplied stained in any color according to your needs. Special finishes to order.

"NOWASCO" WOOD SPOOLS are used by many wire manufacturers for wire prepared for retail sale.

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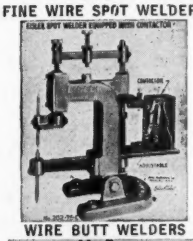

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CUTTING & BENDING MACHINES

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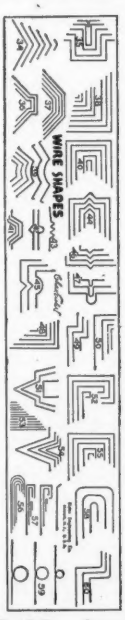
Cam Milling Service



EISLER ENGINEERING CO., Inc.
747 So. 13th St., Newark 3, N. J., U. S. A.

To Manage Eastern Sales for G.E.'s Chemical Department

The appointment of **F. C. Tucker** as manager—Eastern Sales for the **General Electric Company's** Plastics Department has been announced by **Willard R. Barrett,** manager—marketing for the Department.

★ ★ ★

The position is a newly-created one involving coverage of New York, Pennsylvania and the Atlantic Seaboard, according to Mr. Barrett. Plastics Department sales representatives in New York City, Boston, Meriden, Conn., and Philadelphia will report to Mr. Tucker.

★ ★ ★

In his new post, Mr. Tucker will be responsible for sale of the Department's line of custom-molded plastics products for the refrigeration, electronics, electrical and other industries.

Firth Sterling Promotes Three In Carbide Division

Three promotions have been announced in the Carbide Division of **Firth Sterling Inc. M. L. Backstrom** has been promoted to Assistant Sales Manager and is succeeded in his former post of Chief Engineer by **W. E. Montgomery. John Gabrenas** has been named Assistant Chief Engineer.

★ ★ ★

Mr. Backstrom's background includes a six years' association with National Tube Company in maintenance, production and methods engineering, and three years with Voss Engineering (Pittsburgh) as a service engineer and assistant chief engineer. He joined Firth Sterling in 1948 as a sales engineer. Mr. Backstrom is a member of the American Society for Metals, American Society for Testing Materials and American Ordnance Association and serves on the carbide standards committees of the first two mentioned societies.

★ ★ ★

Mr. Montgomery has been with Firth Sterling for twenty years at various levels of shop engineering and supervision. He began his career in the shop and advanced to the supervisory level in 1940.

★ ★ ★

FITZ
FLY SCREEN LOOMS

Combine the simplicity and convenience of the well-balanced Kintzing design, with many important improvements.

All parts are easily accessible. Fine workmanship and added strength in construction, permit one operator to run more looms at higher speeds.

Motor-driven Warp Winding Machines with slow starting, and slow, gradual acceleration.

Truck-mounted, motor driven, cloth winding machines. All-steel backbeams, bobbin winders, etc.

•

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HEANIUM®

Quality Guides

Highly resistant to wear.
Decreases down-time and replacement cost.

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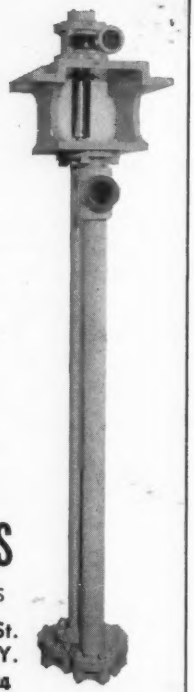
New Haven, Connecticut

WEMCO MOLTEN METAL PUMP

Air Driven
for
Rapid Transfer
of
ZINC
LEAD
ALUMINUM
TIN
THEIR ALLOYS
and
HEAT TREATING
SALTS



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YARNS

For electric wire. Acetate, nylon and silk, natural or dyed. Put up on braider tubes, spools or cops.

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Division of Aetna Industrial Corp.

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JOHN G. ARCHER
Fourth and Grand
West Des Moines, Ia.

S. D. LOCHHEAD
1934 No. Washtenaw Ave.
Chicago 47, Ill.

Mr. Gabrenas gained a background in tool making and design with Metro Tool & Gauge Company, Douglas Aircraft and the electromotive division of General Motors before joining Firth Sterling in 1948 as a service engineer. Before coming to Pittsburgh, he was service engineer for the Company's Chicago District.

Made Coast Manager for Roebling

Robert J. Cole, prominently identified with construction of many of the country's largest suspension bridges built during the past 25 years, including the Golden Gate and the new Tacoma Narrows span, has been named by the **John A. Roebling's Sons Corporation** as Pacific Coast Manager of the firm's Construction Materials Division.

★ ★ ★

Mr. Cole, more recently serving as President of the **Pointer-Willamette Company** at Edmonds, Washington, will now direct the sale of Roebling wire and stranded steel products for prestressed concrete use. Beginning September 1, his offices will be located in the Corporation's San Francisco District headquarters at 1740 17th Street.

Glass Fibers Establishes Western Division

Establishment of the Western Division of **Glass Fibers Inc.,** with full responsibility for administrative, manufacturing and sales activities in eleven western states, has been announced by **Randolph H. Barnard,** president of the firm.

★ ★ ★

M. Dean Worcester, vice president of the company, has been appointed general manager of this new Western Division with headquarters in Burbank, California. Mr. Worcester had formerly been general manager of the firm's Burbank Division which now becomes a part of the larger divisional operation.

★ ★ ★

John T. Podorean has been advanced to general sales manager of the Western Division. He had

HKP PORTER HANDKLIP 6C WIRE CUTTER

For FREE CUTTING of wires, cable, rods, boling wire and bolts up to medium hardness.

One of the handiest, most useful cutters ever made. Parrot-beak jaw quickly locates material for easy cutting. Protruding tip of jaw prevents wire from slipping, aids in stretching wire and is great for pulling out staples.

Essential equipment for cutting high tensile communication and power wires used in rural electrification (Model 6B with special hard cutting edges). See your supplier.

H. K. PORTER, INC.
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NATIONAL OFFERS YOU THREE SERVICES

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- DIAMOND POWDERS—Complete line of graded quality powders for all lapping and finishing operations on wire drawing dies. First grades only.
- DIAMOND GRINDING WHEELS—A complete line of top-quality wheels for industrial production.

Write for prices.

NATIONAL RESEARCH COMPANY

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ST. CLAIR SHORES, MICH.

formerly held the same post in the Burbank Division.

★ ★ ★

Manufacturing and warehouse facilities of the newly-created Western Division are located at Burbank in a new 22,000 square foot building at 3115 Van Owen Boulevard. This structure was recently completed and replaces the former building completely destroyed by fire in October 1953.

Firth Sterling Adds Four New Distributors

In line with its policy of expanded distribution, **Firth Sterling Inc.** has appointed four new distributors of its steel and carbide products in the Midwest and Southeast. All four will distribute Firthite tools, tips, and blanks; toolholder bits; drill rod; and ground flat stock:

K. P. Wesseling Company will service the St. Louis area.

The Cincinnati Supply Company Inc., will be an additional distributor in the Cincinnati area.

The Noland Company, through its branches in Norfolk, Newport News, Roanoke, Washington, D. C., Atlanta, Chattanooga and Birmingham, will provide coverage in those areas.

The Phoenix Steel Supply Company will distribute Firth Sterling products throughout the Midwest primarily in the Chicago area. This distributor will also stock Firth Sterling high speed steels and tool and die steels.

High Speed Steel Stock List Offered by Firth Sterling Inc.

A high speed steel stock list for the metal working industry has just been released by **Firth Sterling Inc.**, 3113 Forbes St., Pittsburgh 30, Pa. This bulletin lists over 800 sizes in five grades of high speed steel. The use of this bulletin will help to overcome longer delivery on mill orders. The company has developed substantial warehouse stocks of high speed steel to assure prompt delivery.

★ ★ ★

Request Firth Sterling bulletin SL-2077.

★ ★ ★

REELS • SPOOLS

ALL SIZES

WOOD - PLYWOOD - WOOD - METAL

RETURNABLE NON-RETURNABLE

Samples and Prices on Request

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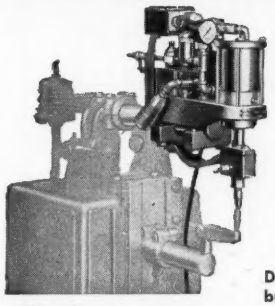

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Spot, Butt, Seam, Gun, Flash, Projection, Multi-Point and Stud Welders

NEW • USED • REBUILT

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Spot welder air conversion unit. Tests prove 10,000 welds hourly on continuous daily schedules.

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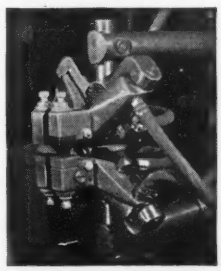
Automatic butt welding attachment. Water-cooled, fits any spot welder with minimum horn clearance of 7".



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Fine products are made from fine-quality materials. That's why so many fabricators and formers select Cortland Brand specialized low carbon wires. Cortland Brand wires are among the finest available . . . made from the best corrosion-resisting, open-hearth steel in Wickwire's own mills. Use them for your products . . . in any of the following types, sizes and finishes.

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SIZE: coils, spools or straightened cut to length.
FINISH: plain, galvanized, coppered or tinned.
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CABLE REELS

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LUMBER & WOODWORK LTD.

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MUSIC WIRE and SPECIAL WIRES

Music Wire for Industrial Purposes
211 sizes Bright Polished, .0015" to .3437"
45 sizes Bright Tinned, .003" to .125"
Aluminum—Annealed—Belt Lacing—Brass, Soft and Spring—Copper, Bare and Tinned
Coppered Steel Spring—Galvanized—Tinned
Monel—Nickel Silver—Pure Soft Nickel—Oil Tempered, Steel Spring, Black Finish
Phosphor Bronze, Spring Temper—Pure Iron Wire—Resistance Wire,
Hoskins Chromel "A"—Stainless, Soft and Spring Temper—Tag Wire, 1000
in an Envelope—Florist Wire—Spooled and Coiled, 1/4-1/2-1-5#
Wires Straightened and Cut to length—Small Gauges—Small orders our specialty
Wires and Strands for the fishermen. Trolling Wires, Copper-Monel-Stainless.
Leader Wires, "Wilstabrite" Stainless and "Silverbrite" Music.

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RETURNABLE **NON-RETURNABLE**

Prices on Request

REELS

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STRAND-BUFFALO CORP. **NORTH TONAWANDA, N. Y.**

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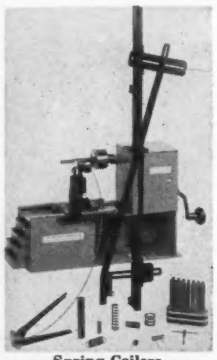

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For coiling Compression, Extension and Torsion springs. Ideal for making samples and small lots up to 1000 quickly and accurately.

Available in two sizes.

For testing loads and deflections of Compression and Extension springs.

Available in four capacities: 25, 100, 200 and 300 lbs.

Write for prices and bulletins.

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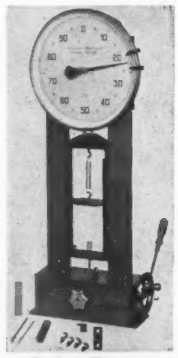

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FINE WIRE MACHINES • SPOOLERS • POINTERS
PATENTING, TEMPERING, GALVANIZING AND
TINNING EQUIPMENT FOR WIRE

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172 UNION STREET • WORCESTER, MASS.

To Service Cleveland District for Roebling

Edwin F. Whitehill, of Jackson, Michigan, has been named by the **John A. Roebling's Sons Corporation** as Cleveland District Manager for the Corporation's Wire and Cold Rolled Products Division. Roebling is a wholly-owned subsidiary of the **Colorado Fuel and Iron Corporation.**

★ ★ ★

Since December 1950, he has covered important Roebling accounts in Michigan and Indiana. Prior to that, he had been assigned to the Chicago District as a Wire and Cold Rolled Specialty Salesman. Employed by the Roebling organization since 1949, Whitehill first worked as a Woven Wire Fabrics Sales Representative. Shortly thereafter he transferred to the firm's Wire Mills at Roebling, N. J., serving 12 years in various capacities, including Production Planning.

Rome Cable Corporation Appoints New Manager of Torrance Plant

The appointment of **Glenn Koger** as manager of the Torrance plant of the **Rome Cable Corporation,** effective July 1, 1954, has been announced by **A. D. Ross Fraser,** president. **Gilbert Woodill,** who has been acting manager of the Torrance plant for several months, has recently been elected as Assistant Treasurer of the company.

★ ★ ★

Mr. Koger is an electrical engineering graduate of Kansas State College, class of 1929. He was with the General Electric Company for 19 years, 17 years of that time in the insulated wire department at Bridgeport, Conn. He was Designing Engineer there for 8 years, and head of the Engineering Department for 5 years.

★ ★ ★

In 1948 Mr. Koger joined Walker Brothers, manufacturers of electrical construction materials, in Conshohocken, Pa., as Vice-President in charge of copper products, and a director of the company. He served in that capacity until March, 1954, when he went with the Rome Cable Corporation.

★ ★ ★

Specify
Warner
BELL-MINE LIME PRODUCTS
Laboratory quality control assures dependability for wire drawing
• Pulverized Quick Lime
• Hydrated Lime
• Pebble Lime
WARNER COMPANY
Sales Offices
BELLEFONTE PHILADELPHIA
PITTSBURGH NEW YORK

During the Korean War Mr. Koger served as a member of the National Advisory Committee of the Insulated Wire Industry, working with both the National Production Authority and the Office of Price Stabilization.

★ ★ ★

The headquarters and main plant of the Rome Cable Corporation are at Rome, New York. The Torrance plant, at 1738—213th Street, Torrance, Calif., produces electrical metallic tubing and rigid conduit. It is the only American plant licensed to use the Sendzimir hot dip galvanizing process in the manufacture of steel tubing.

New "Cold Cleaners" Improve Plant Safety

To replace highly volatile solvent cleaners in still tanks on the production line, a new combination "cold" cleaner is offered by **E. F. Houghton & Co.** of Philadelphia. Plant safety is increased by eliminating this fire hazard.

★ ★ ★

Other advantages claimed for this room temperature, water-emulsion cleaning combination of Houghto-Clean 402-403 are: thorough removal of most generally encountered shop soil; protection of freshly cleaned surfaces from rusting between operations or in temporary indoor storage; elimination of heating system costs; and improved working conditions by the elimination of steamy, uncomfortable atmospheric conditions associated with hot alkaline cleaning methods.

★ ★ ★

The Houghto-Clean 402-403 combination is easy to use and mixes readily in economical proportions with cold water to provide efficient still tank cleaning. For complete details, contact E. F. Houghton & Co., 303 W. Lehigh Avenue, Philadelphia 33, Pa.

Time to Discard OLD-FASHIONED WAYS
Jacks . . props . . shores . . horses . . why fool with these obsolete methods of handling reels? DO IT THE MODERN, EFFICIENT WAY! Reel or unreel wire, cable, rope with
ROLL-A-REEL

Simple, strong, easily handled stand for your reels to save time and labor. Adjustable slots for wide variety of reel sizes.
Style A: 2,000 lbs. cap. 37.50
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STANDARD 5", 6½" x 10½" DIA. SPOOLS TO MEET ALL RIGID NON-RETURNABLE REQUIREMENTS
MASON CAN COMPANY
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30,000,000 FEET OF WIRE FROM "BRIDGEPORT" CARBIDE NOZZLES!
These are made for use in extruding machines in covering electric wire with rubber or plastics.
Carbide nozzles are giving 300 times the production secured from those made of tool steels.
Precision-made carbide tools, any type, made to your order.
WIRE TOOL DIV., BRIDGEPORT JIG BORING COMPANY
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WIRE and TUBE DRAWING DIES

Great Hardness • High Polish

DESIGNED ESPECIALLY FOR THE DRAWING OF

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"Genii of the Flame" is a 16mm, full color sound film describing the applications of gas in industrial processing and its use in homes. The film starts with man's earliest uses of gas and his attempts to make heat work for him. It brings the viewer rapidly to our present day living and shows the use of gas in making all types of industrial products. The film covers the steel, transportation, glass, food, and many other industries.

★ ★ ★

This film is available to technical societies, civic groups and other organizations interested in a semi-technical, informative, one-half hour program.

★ ★ ★

The "Genii of the Flame" may be obtained on request by writing to Surface Combustion Corporation, Toledo 1, Ohio, attention Advertising Department. In making requests, please specify three alternate dates, indicating first, second and third choices. In all cases we will make every attempt to meet the first choice in requested dates.

★ ★ ★

There is no charge for showing this film. The only obligation is that it be returned promptly after use and information be given as to the number and type of people in the audience and any comments which they may have.

New Metal Forming Machine For Short Production Runs

Lund Products Division of Artys Sales Company, 11 Broadway, New York 4, New York, announce a new, hand operated, metal forming machine—the Curvette.

★ ★ ★

Designed to meet the need for individual bending jobs, or short production runs, the Curvette is extremely simple to operate. A roller of hardened and ground steel, with needle bearings, rolls on the outside circumference of the wire, strip, channel or tube to be formed as the hand lever is

The TOP
DIAMOND DIES
are made by
PHILIPS

For your most exacting wire drawing requirements, standardize on NORELCO Diamond Dies, made by the master craftsmen of PHILIPS in the world's largest, most modern diamond die factory.

Only the very best South African and Brazilian diamonds are used. Each consists of one closed crystal. Less than .4% of all the diamonds mined meet PHILIPS high quality requirements for purity, structure and shape.

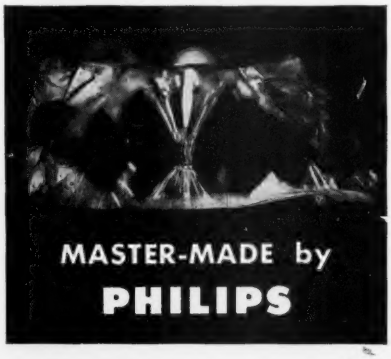
These diamonds are drilled to precision tolerances, varying in proportion to the diameter, normally 0.3 to 3.5 microns. Closer tolerances can be supplied, if required.

Let us quote on your diamond die requirements.

North American Philips Company, Inc.
Elmet Division, Lewiston, Maine

Norelco

Note below the highly polished precision shaped drawing channel of this die for drawing copper which gives a burnished finish to the wire and long life to the die.



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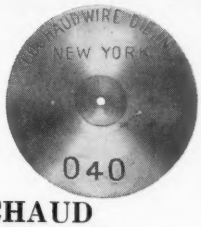
PHILIPS

Wire
Drawing
Diamond
Dies



COCHAUD
WIRE DIE INC.
300 W. 56th St., NEW YORK
Tel. COlumbus 5-1340

swung around the arbor. There is no defacing of the metal surface and a smooth, contour bend is assured.

★ ★ ★

Because of the simplicity and precision engineering of the entire mechanism, plus extreme ruggedness, it is easy to reset or change over from one bending job to another. This is especially important in shops where samples, maintenance pieces or individual jobs are more frequent than long production runs. It does not tie up heavier equipment. When desired, two Curvettes can be used as a double bending machine for two simultaneous forming operations.

★ ★ ★

The finest materials and workmanship have gone into the manufacture of the Curvette to assure long service life and precision bending. It will form basic wire up to ¼" diameter and multiples of smaller sizes, strip metal up to ¾" by ⅓" and thin-walled tubing up to ⅜" diameter. A special feature is an attachment for coiling, curving and ringforming of wire and tubing.

★ ★ ★

Dealerships are now being appointed in major cities in this country and abroad.

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and
TUNGSTEN CARBIDE
DIES
for all WIRE DRAWING purposes.

SPECIALISTS IN DIE REPAIR
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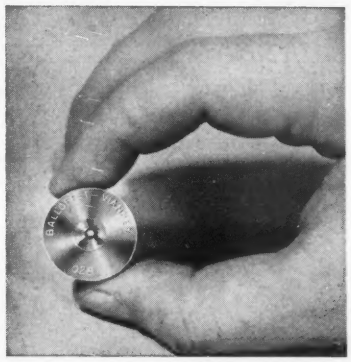

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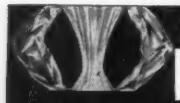
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New "Condensifilters" Announced

Two new models of the Condensifilter for dehydrating and filtering compressed air have been announced by Hankison Corporation.

★ ★ ★

The new models, the M-30 and M-100, are rated at 30 and 100 SCFM respectively, at line pressure of 100 psig. Both models feature a condenser to reduce compressed air dew points, plus a disposable filter cartridge for removing solid particles. The new prefabricated steel case has a spun elliptical head that permits operating pressures up to 200 psig. All sealing is with "O" rings, eliminating the need for tools to dismantle the units for service.

★ ★ ★

In operation, compressed air enters the Condensifilter through the steel center shaft and passes into the spiral copper condensing section, reducing the temperature of the air to within 2 or 3 degrees of the cooling water temperature. The air then passes upward and through the cotton felt filter cartridge, reenters the center shaft, and returns to the system. Condensed vapors drop into the condensate collection chamber, and can be manually discharged or trapped to drain.

★ ★ ★

For detailed information, write Hankison Corporation, 951 Banksville Road, 318 Biltmore Building, Pittsburgh 16, Pa.

Power Tool Announced for Driving Wire Thread Inserts in High-Volume Production Use

Cost-conscious design and production engineers will be interested in the new power inserting tool for large-scale installation of wire thread inserts—long used for providing strong, permanent threads in aluminum, magnesium, plastics, copper and wood as well as steel. The power tool is designed to drive inserts to provide internal threads in sizes ranging from No. 6 to ¼", National Coarse and Fine. The same basic

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TWO PLANT VISITS SCHEDULED FOR WIRE ASSOCIATION CONVENTION

●

During the Silver Anniversary Convention of the Wire Association there will be two tours of Detroit plants that will be available to those in attendance.

●

Both Ferrous and Non-Ferrous Sections of the Association are invited to take these plant visits jointly, which will take all day.

At 9 A.M. busses will leave the Statler Hotel for a visit to the die-making plant of The Carboloy Department of the General Electric Company in Detroit. Following the tour Carboloy will serve a buffet luncheon with their compliments.

At about 2 P.M. the group will arrive at Dearborn to visit the exhibits of the Ford Motor Company's Rotunda Building and to see the highlights of their Rouge Plant. This will include a tour of the steel making operations, the rolling mill, the press plant and, finally, the Dearborn Final Assembly Plant.

If you have not yet made arrangements to attend the Silver Anniversary Convention, write for a reservation card to

●

THE WIRE ASSOCIATION

453 Main St., Stamford, Conn.

tool is used for all inserts in this size range, with only a few quick changes required in the tip or driving end for each size.

★ ★ ★

The inserting tool can be powered either by air or electricity. It can be used as a portable tool or held in a drill press or universal tool holder. Sketches and suggestions on power driving techniques and fixtures are available from the **Heli-Coil Corporation,** Danbury, Conn., makers of wire thread inserts and tools.

Announces New 5000-Volt Power Cable

A new type of non-metallic sheathed cable designed especially for 5000-volt power feeder service has been announced by the **Rome Cable Corporation,** of Rome, N. Y.

★ ★ ★

Through the use of Polyethylene insulating compound and a Polyvinyl-Chloride sheath, this new cable has a smaller diameter and is lighter in weight than similar cables of equivalent capacity.

★ ★ ★

These coating compounds provide superior resistance to chemicals, moisture and to mechanical damage and wear, resulting in long service life.

★ ★ ★

The cable has three conductors, each individually shielded throughout its entire length with a metallic shielding. Ground wires, having a total cross section of at least 90% of the area of one conductor, are placed in the interstices in contact with the shielding on the individual conductors. Fillers are used to round out the core assembly. The core is taped and then covered with a tough exterior jacket of Rome Synthinol (Polyvinyl-Chloride).

★ ★ ★

This construction offers excellent protection to personnel and against lightning. This cable is suitable for installation in boreholes, shafts, horizontal runs in underground entries, aerial suspension on insulators and many

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other mining and industrial applications.

★ ★ ★

The cable is available in sizes ranging from #6 AWG to 250 MCM. The #6 AWG cable, with a rated capacity of 72 amperes, is 1.22″ in diameter, and weighs 895 lbs. per 1000 ft. The 250 MCM cable is 2.21″ in diameter, is rated at 271 amperes, and weighs 4535 lbs. per 1000 ft.

★ ★ ★

Additional information about this new power cable can be obtained by writing to the Rome Cable Corporation, Rome, New York.

Changes in Twenty-Five Years

(*Continued from page* 1198)

This has been accomplished through conventions and regional meetings, through the publication of articles in the official publication of the Association, Wire and Wire Products, and through the technical information services rendered through the Association's offices to members.

★ ★ ★

That its purposes are being accomplished is attested by the steady and healthy growth of our society, which from an original membership in 1930 of some fifty persons, now has over one thousand members in all parts of the industrial world.

★ ★ ★

The end, however, is not yet. In the next twenty-five years the Directors look forward to an expansion of the services of the Association, to a further increase in membership and to a gradual broadening of benefits from those of the present to ever higher planes of achievement and service.

Comments on Dr. Saxl's Article on Determination of Wire Tensions

(*Continued from page* 1208)

point on the stress-strain curve at which the natural tangent is equal to 1.5 times the angle of the lineal portion of the curve, with respect to the axis of ordinates or Y axis. (See J. B. Johnson, Materials of Construction, John Wiley & Sons, N. Y.)

★ ★ ★

For a hard drawn copper wire (and the fine copper wires due to their repeated drawing are comparatively hard), the Johnson elastic limit is 44,000 pounds per square inch.

★ ★ ★

Hence the suggested load of 15,000 pounds per square inch for which the table of safe operating tension is calculated is well within the conservative limits of safe operating tension."

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Miller, R. H. Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Pacific Coast Borax Co., New York, N. Y.
Standard Industrial Compounds Co., Chicago.
Swift & Company, Chicago, Ill.

CONDUCTORS—Flexible, Electrical
Montgomery Co., The, Windsor Locks, Conn.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Mach'y, Inc. (used) Pawtucket. R. I.

CORDS—Electrical, Tinsel Conductor
Montgomery Co., The, Windsor Locks, Conn.

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Utica Drop Forge & Tool Corp., Utica, N. Y.
Vascoloy-Ramet Corp., Waukegan, Ill.
Willey's Carbide Tool Co., Detroit, Mich.

CUTTING TOOLS—Wire
Porter, H. K. Inc., Somerville, Mass.

DESCALING PROCESS—Sodium Hydride
du Pont de Nemours & Co., Inc., E. I., Wilmington, Del.
Fisher Associates, New York, N. Y.

DIAMONDS—Industrial
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Molina Industrial Diamond Co., New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
United States Industrial Diamond Corp., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDERS—
Danforth, The C. W. Co., Youngstown, Ohio
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Indiana Wire Die Co., Ft. Wayne, Ind.
Industrial Diamond Powders, Pittsburgh, Pa.
Molina Industrial Diamond Co., New York, N. Y.
National Research Company, St. Clair Shores, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
United States Industrial Diamond Corp., New York, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDER RECLAIMING—
Danforth, The C. W. Co., Youngstown, Ohio
Industrial Diamond Powders, Pittsburgh, Pa.
Kay & Warren Co., Brooklyn, N. Y.
National Research Co., St. Clair Shores, Mich.
Molina Industrial Diamond Co., New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DIAMOND TOOLS—
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Carbide, Tungsten & Tantalum
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Vascoloy-Ramet Corp., Waukegan, Ill.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Cold Heading
Carboloy Dept. of General Electric Co., Detroit
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Vascoloy-Ramet Corp., Waukegan, Ill.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Cochaud Wire Die Inc., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Molina Industrial Diamond Co., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., Elmet Div., Lewiston, Me.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.

DIES—Eyelet
Eastern Carbide Corp., New Rochelle, N. Y.
Kelly Wire Die Corp., New York, N. Y.

DIES—Nail, Nail Cutters, Feeder Blocks, Grippers, etc.
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

DIES—Pointing
Sjogren Tool and Machine Co., Auburn, Mass.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc, New York, N. Y.
Carboloy Dept. of General Electric Co., Detroit.
Cochaud Wire Die Inc., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Ft. Wayne Wire Die., Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., Elmet Div., Lewiston, Me.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Vascoloy-Ramet Corp., Waukegan, Ill.
Wayne Wire Die Co., Hillside, N. J.

DIES—Special Shapes, Etc.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Swaging
Sjogren Tool and Mach. Co., Inc., Auburn, Mass.

DIES—Tube Drawing
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., Waukegan, Ill.
Willey's Carbide Tool Co., Detroit, Mich.

DRAW BENCHES—
(See MACHINERY—Draw Benches)

DRUMS & TRAVERSES—For Cable Reels
Hubbard Spool Co., Garrett, Ind.
New York Engineering Co., Yonkers, N. Y.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

DRYING EQUIPMENT
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio.
Michigan Oven Co., Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.

ENGINEERS—Consulting
Lubricants—Hans C. Bick, Inc., Reading, Pa.
Wire Mill—Clarence S. Arms, Worcester, Mass.
Zinc—Imhoff, Wallace G. Co., Los Angeles, Calif.
Seymour, Leroy, Trenton, N. J.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FENCING & FENCES—Wire
Interlocking Fence Co., Morton, Ill.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio
Harper Electric Furnace Corp., Buffalo, N. Y.
Rockwell, W. S. Co., Fairfield, Conn.

FURNACES—Galvanizing Equipment
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engineering Co., The, Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Heat Treating
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl Mayer Corp., The, Cleveland, Ohio

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

Electric Furnace Co., Salem, Ohio
Drever Company, Phila., Pa.
Rockwell, W. S., Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engr. Co., Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio

FURNACES—Pot (oil, gas, electric)
Ajax Electric Co., Inc., Philadelphia, Pa.

FURNACES—Resistance Heating, Strand
(See Annealing Machines)

FURNACES—Salt Bath
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio

GALVANIZING EQUIPMENT — (See MACHINERY—Galvanizing Wire)

GRINDERS—Roll
Norton Co., The, Worchester, Mass.

GUIDES—For Wire
Heany Industrial Ceramic Corp., New Haven, Conn.
Lignum-Vitae Products Corp., Jersey City, N. J.

GUIDE TIPS—For Extruding Machines (See NOZZLES)

HAMMERS—Nail Heading
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

HAMMERS—Swaging
Sjogren Tool and Machine Co., Auburn, Mass.

HARDSURFACING ALLOYS—
(See Alloys—Hardsurfacing)

HOOKS—Pickling & Liming
Youngstown Welding & Eng'g Co., Youngstown, Ohio

HOISTS—Electric Travelling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

INSULATING MATERIALS—
Electronic Rubber Co., Stamford, Conn.
Heineman Corp., Oscar, Chicago, Ill.
Libbey-Owens, Ford Glass Co., Fiber Glass Div., Toledo, Ohio
Merrimac Paper Co., New York, N. Y.
New England Lacquer Co., E. Providence, R. I.

INSULATING MATERIALS — Paper—For Electric Wire Cable
Merrimac Paper Co., New York, N. Y.

LACQUERING SYSTEMS — See MACH.—Lacquering Electric Wire

LACQUERS—For Electric Wire
New England Lacquer Co., E. Providence, R. I.

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LIME—
Warner Co., The, Philadelphia and Bellefonte, Pa.

LUBRICANTS — For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Swift & Co., Chicago, Ill.

MACHINERY—Armoring (Cable, Wire, Hose)
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Barbed Wire
Glader Wm., Machine Works, Chicago, Ill.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Braiding
Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Wardwell Braiding Mach. Co., Central Falls, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bunching
Cook Manufacturing Co., The, Paterson, N. J.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Inc., Philadelphia, Pa.
Haskell-Dawes Machine Co. Philadelphia, Pa.
New England Butt Co., Providence, R. I.
New York Engineering Co., Yonkers, N. Y.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Machinery—Winding Wire)

MACHINERY—Centerless Grinding
Schumag Schumacher Metallwerke, Aachen, Germany.

MACHINERY—Chain Making
Cosa Corporation, New York, N. Y.
Nilson, A. H. Machine Co., Bridgeport, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Closing Rope
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling Rod
Vaughn Mach'y Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Cold Heading
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Copper Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh.
American Insulating Mach'y Co., Phila., Pa.
National Mach'y Exch. (Used), New York.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)

MACHINERY—Crimping Wire
Cedar West Tool Co., New York, N. Y.

MACHINERY—Cutting
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool, Inc., New Haven, Conn.
Utica Drop Forge & Tool Corp., Utica, N. Y.
Wean Equipment Corp., Cleveland, Ohio
Wells, Frank L., Co., Kenosha, Wis.

MACHINERY—Descaling Rod, Dry
Fisher Associates, New York, N. Y.
Herborn, Herborn, Germany.

MACHINERY—Diameter Testing Continuous
Standard Electronic Research Corp., New York, N. Y.

MACHINERY—Die Making
Boulin, Victor J., Inc., New York, N. Y.
Carboloy Dept. General Electric Co., Detroit, Mich.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Firth Sterling, Inc., Pittsburgh, Pa.
International Wire Products Co., Midland Pk., N. J.
Kelly Wire Die Corp., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Electrode Grinding
Cosa Corporation, New York, N. Y.

MACHINERY—Edging (See MACHINERY — Tandem Rolling and Edging Mills)

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, Ohio
International Wire Products Co., Midland Pk., N. J.
Michigan Oven Co., Detroit, Mich.
Rockwell Co., W. S., Fairfield, Conn.

MACHINERY—Extruding
Aetna-Standard Engineering Co., Pittsburgh.
Davis-Standard Sales Corp., Mystic, Conn.
Royle, John, & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Interlocking Fence Co., Morton, Ill.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Mettler Machine Tool, Inc., New Haven, Conn.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Forming Wire
Baird Machine Co., Stratford, Conn.
Lund Products Div., Artys Sales Corp., New York, N. Y.
Nilson, A. H., Machine Co., Bridgeport, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Fourdrinier Looms
Cedar West Tool Co., New York, N. Y.

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Providence, R. I.
International Wire Products Co., Midland Pk., N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Insulating Wire
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Davis-Standard Sales Corp., Mystic, Conn.
Ets. Pourtier Frères, Romainville, France
Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Mach. Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Inc., Philadelphia, Pa.

MACHINERY—Lacquering Electric Wire
American Insulating Mach'y Co., Philadelphia.
Cook Mfg. Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, O.
Michigan Oven Co., Detroit, Mich.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Looms, Wire Weaving
Cedar West Tool Co., New York, N. Y.
Interlocking Fence Co., Morton, Ill.
Mummert-Dixon Co., Hanover, Pa.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Material Handling
(See Material Handling Equipment)

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wis.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Baird Machine Co., The Stratford, Conn.
Glader, Wm., Machine Works, Chicago, Ill.
National Mach'y Exch. (Used), New York, N. Y.
Seybold Transworld Exporters, New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Packaging Wire
Coulter & McKenzie Machine Co., Bridgeport, Conn.

MACHINERY—Pickling
Chemsteel Construction Co., Pittsburgh, Pa.
Youngstown Welding & Eng'g Co., Youngstown, Ohio.

MACHINERY—Pin Making
Baird Machine Co., The, Stratford, Conn.
Cosa Corporation, New York, N. Y.

MACHINERY—Pointing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used). New York.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Poultry Wire Fencing
Interlocking Fence Co., Morton, Ill.
Wean Equipment Corp., Cleveland, O.

MACHINERY—Re-Spooling
Boyd & Sons Manufacturing Corp., Philadelphia, Pa.
Cedar West Tool Co., New York, N. Y.
Davis Electric Co., Wallingford, Conn.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
International Wire Products Co., Midland Pk., N. J.
Mummert-Dixon Co., Hanover, Pa.
National Mach'y Exch. (Used), New York, N. Y.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Schumag Schumacher Metallwerke, Aachen, Germany
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Rubber Insulating
Davis-Standard Sales Corp., Mystic, Conn.
Royle, John & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Serving
Ets Pourtier Freres, Romainville, France
Fidelity Machine Co., Phila., Pa.
Wardwell Braiding Machine Co., Central Falls, R. I.

MACHINERY—Spark Testing
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Peschel Electronics, Inc., New Rochelle, N. Y.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Spring Making
Carlson Company, The, New York, N. Y.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Staple
Seybold Transworld Exporters, New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt, Germany.

MACHINERY—Straightening & Cutting
Cosa Corporation, New York, N. Y.
Lewis Machine Co., The, Cleveland, Ohio
Medart Co., The, St. Louis, Mo.
Mettler Machine Tool Co., New Haven, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Stranding
Haskell-Dawes Machine Co., Philadelphia, Pa.
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Studmaking
Cosa Corporation, New York, N. Y.

MACHINERY—Swaging
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Take-Up and Pay-Out
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Sales Corp., Mystic, Conn.
Ets. Pourtier Frères, Romainville, France
Federal Manufacturing Co., Wallingford, Conn.
Industrial Ovens, Inc., Cleveland, Ohio
International Wire Products Corp., Midland Park, N. J.
Michigan Oven Co., Detroit, Mich.
New York Engineering Co., Yonkers, N. Y.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Testing Magnet Wire Coatings for Pin Holes
Peschel Electronics, Inc., New Rochelle, N. Y.

MACHINERY—Testing, Physical
Scott Testers, Inc., Providence, R. I.
Spring Mfgs. Supply Co., Plantsville, Conn.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Michigan Oven Co., Detroit, Mich.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.
International Wire Products Corp., Midland Park, N. J.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill, Cold Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N. J.
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.
International Wire Products Corp., Midland Park, N. J.

MACHINERY—Used
National Machinery Exchange, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.

MACHINERY—for Wire Welding
(See WELDERS—Butt and Spot)

MACHINERY—Washer Forming
Cosa Corporation, New York, N. Y.

MACHINERY—Winding Wire
Cedar West Tool Co., New York, N. Y.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Newark, N. J.
Federal Manufacturing Co., Wallingford, Conn.
Michigan Oven Co., Detroit, Mich.
Mummert-Dixon Co., Hanover, Pa.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
Lund Products Div., Artys Sales Corp., New York, N. Y.

MACHINERY—Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Herborn, Herborn, Germany
International Wire Products Corp., Midland Park, N. J.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Schumag Schumacher Metallwerke, Aachen, Germany
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Wire Forming
Baird Machine Co., The, Stratford, Conn.
Cosa Corporation, New York, N. Y.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Wire Rope
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
Terkelsen Machine Co., Boston, Mass.

MACHINERY—Welded Wire Fabric
Maschinen & Stahl, A. G., Entwicklungs Verwertungs Gesellschaft, Switzerland

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem, Rolling & Edging
Wean Equipment Co., Cleveland, Ohio

NAIL TOOLING—Tungsten Carbide
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Brothers, Inc., Cortland, N. Y.

NOZZLES—For Extruding Machines
Wire Tool Div., Bridgeport Jig Boring Co., Bridgeport, Conn.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Michigan Oven Co., Detroit, Mich.
Rockwell Co., W. S., Fairfield, Conn.

OVENS—Rod Bakers
Carl-Mayer Corp., The, Cleveland, Ohio

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Michigan Oven Co., Detroit, Mich.

PAINT—Acid Proof
Ceilcote Company, Cleveland, Ohio

PAINT BONDING CHEMICALS—
American Chemical Paint Co., Ambler, Pa.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.

PAPER—Creped Wrapping
Arkell Safety Bag Company, New York, N. Y.
National Waterproof Papers, Inc., Camden, N. J.
Terkelsen Machine Co., Boston, Mass.

PAPER—For Coil Wrapping and Corrosion Prevention
Arkell Safety Bag Company, New York, N. Y.
National Waterproof Papers, Inc., Camden, N. J.
Terkelsen Machine Co., Boston, Mass.

PATENT ATTORNEYS—
Lancaster, Allwine & Rommel, Washington, D. C.

PAY-OUT SYSTEMS—
(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS
(See COMPOUNDS—Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PICKLING—Hooks, etc. Acid Resisting
Youngstown Welding & Eng'g Co., Youngstown, Ohio

PICKLING TANK LININGS—
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio

PIPES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

PLASTICS—for Wire Insulation
Electronic Rubber Co., Stamford, Conn.

PLIERS—For Wire
Utica Drop Forge & Tool Corp., Utica, N. Y.

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio

PRESSES—Hydraulic and Mechanical
Aetna-Standard Engineering Co., Pittsburgh, Pa.

PULLERS AND GRIPS—For Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Wean Equipment Corp., Cleveland, Ohio

PUMPS—Molten Metal
Fisher Associates, New York, N. Y.

REEL AND TENSION STANDS—
Davis Electric Co., Wallingford, Conn.
Fidelity Machine Company, Inc., Philadelphia
Industrial Ovens, Inc., Cleveland, Ohio.
Moslo Machinery Co., Cleveland, Ohio
New York Engineering Co., Yonkers, N. Y.
Roll-A-Reel, Cincinnati, Ohio
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.

REEL CRUTCHES—
Roll-A-Reel, Cincinnati, Ohio
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Hubbard Spool Co., Garrett, Ind.
Milton Machine Works, Inc., Milton, Pa.
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Garrett, Ind.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

REELS—Metal Bound
Durkee Mfg. Co., Pine River, Minn.
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., Wm., Westport, Mass.

REELS—Plywood
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., Wm., Westport, Mass.
Nelson Company, The, Baltimore, Md.

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark, J. L. Mfg. Co., Rockford, Ill.
Hubbard Spool Co., Garrett, Ind.
Mason Can Company, East Providence, R. I.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New York Engineering Co., Yonkers, N. Y.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Durkee Mfg. Co., Pine River, Minn.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

Hubbard Spool Co., Garrett, Ind.
Mason Can Company, East Providence, R. I.
McCaskie, Inc., Wm., Westport, Mass.
Mettler Machine Tool, Inc., New Haven, Conn.
Milton Machine Works, Inc., Milton, Pa.
Moslo Machinery Co., Cleveland, Ohio
Mossberg Pressed Steel Corp., Attleboro, Mass.
New York Engineering Co., Yonkers, N. Y.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Wooden
American Woodworking Co., Chicago, Ill.
Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Durkee Mfg. Co., Pine River, Minn.
Hubbard Spool Co., Garrett, Ind.
Nelson Company, The, Baltimore, Md.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS—
(See OVENS—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Crucible Steel Co. of America, Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.

RODS—Steel
Crucible Steel Co. of America, Pittsburgh, Pa.

RODS—Wire—Non-Ferrous
Chase Brass & Copper Co., Waterbury, Conn.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Platt Bros. & Co., The, Waterbury, Conn.
Scovill Mfg. Co., Waterbury, Conn.

RODS—Wire, Steel
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Sheffield Steel Corp., Kansas City, Mo.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Blocks
Madesco Tackle Block Co., Easton, Pa.

ROPE—Wire
American Steel & Wire Company, Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Roebling's, John A. Sons Corp., Trenton, N. J.

RUST PROOF COMPOUNDS—
(See COMPOUNDS—Rust Preventing)

RUST REMOVING COMPOUNDS—
(See COMPOUNDS—Rust Preventing)

SATURATION SYSTEMS—
Industrial Ovens, Inc., Cleveland, Ohio
New York Engineering Co., Yonkers, N. Y.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

SOAPS—Industrial and Wire Drawing
(See COMPOUNDS—Wire Drawing)

SODIUM—for Descaling
du Pont de Nemours & Co., Inc., E. I., Wilmington, Del.

SPOOLS—(See Reels & Spools)

SPOOLS—Stamped Metal for Retail Wire Sales
Clark, J. L. Mfg. Co., Rockford, Ill.
Mason Can Co., East Providence, R. I.

STAMPINGS—Steel
Acrometal Products, Inc., Minneapolis, Minn.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Roebling's, John A. Sons Corp., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

STRIPPERS—Wire, Electric
Utica Drop Forge & Tool Corp., Utica, N. Y.

TANKS—Compound
New York Engineering Co., Yonkers, N. Y.
Watson Machine Co., Paterson, N. J.

TANKS—Pickling and Plating
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.

TESTERS — INSULATION
(See MACHINERY—Spark Testers)

TESTING EQUIPMENT
(See MACHINERY Testing, Physical and Diameter Testing)

TINNING PROCESS—
Metal & Thermit Corp., New York, N. Y.

TINSEL—Electric Conductor
Montgomery Co., The, Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper, Silver and False Gold Coated, etc.
(See TINSEL—Electric Conductor)

TOOLS—Nail Machine
Pittsburgh Carbide Die Co., Monongahela, Pa.

TOOLS—Welding Wire, Strip & Foil (Pressure)
Utica Drop Forge & Tool Corp., Utica, N. Y.

TOOLS—Wire Cutting
Porter, H. K. Inc., Somerville, Mass.
Utica Drop Forge & Tool Corp., Utica, N. Y.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRANSMISSIONS—Variable speed (See Machy—Power Transmission)

TRAVERSES & DRUMS—For Reels
Drums & Traverses (See Drums & Traverses)

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.

VALVES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VARNISHES—for Electric Wire
N. E. Lacquer Co., E. Providence, R. I.

VULCANIZING PANS AND EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Hoffman Co., Robt. W., Chicago, Ill.
Maschinen & Stahl, A. G., Entwicklungs Verwertungs Gesellschaft, Switzerland
Micro Products Co., Chicago, Ill.
Utica Drop Forge & Tool Corp., Utica, N. Y.

WIRE—Aluminum
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Malin & Co., The, Cleveland, Ohio
Scovill Mfg. Co., Waterbury, Conn.
Seneca Wire & Manufacturing Co., Fostoria, O.

WIRE—Barbed
Interlocking Fence Co., Morton, Ill.

WIRE—Brass
Academy Metal Products Co., Hoboken, N. J.
Chase Brass & Copper Co., Waterbury, Conn.
Scovill Mfg. Co., Waterbury, Conn.
Spencer Wire Corp., Union, N. J.

WIRE—Brush
Spencer Wire Corp., Union, N. J.

WIRE—Bunched & Stranded, Copper
Camden Wire Co., Camden, N. Y.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Camden Wire Co., Camden, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind
Crucible Steel Co. of America, Pittsburgh, Pa.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Scovill Mfg. Co., Waterbury, Conn.
Seneca Wire & Manufacturing Co., Fostoria, O.
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Copper
Chase Brass & Copper Co., Waterbury, Conn.
Spencer Wire Corp., Union, N. J.

WIRE—For Electrical Conductors
Camden Wire Co., Camden, N. Y.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.

WIRE—Flat, Fine
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Montgomery Co., The, Windsor Locks, Conn.

WIRE—Galvanized
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Roebling's, John A. Sons Corp., Trenton, N. J.
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Manufacturers
Academy Metal Products Co., Hoboken, N. J.
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
Johnson Steel & Wire Co., Worcester, Mass.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Keystone Steel & Wire Co., Peoria, Ill.
National Lock Washer Company, The, Newark, N. J.
North American Philips Co., Inc., Elmet Division, Lewiston, Me.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Scovill Mfg. Co., Waterbury, Conn.
Seneca Wire & Manufacturing Co., Fostoria, O.
Sheffield Steel Corp., Kansas City, Mo.
Spencer Wire Corp., Union, N. J.
U. S. Steel Co., N. Y., N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Music
American Steel & Wire Co., Cleveland, Ohio
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., The, Cleveland, Ohio
Seneca Wire & Manufacturing Co., Fostoria, O.
Spencer Wire Corp., Union, N. J.

WIRE—Needle
Carpenter Steel Company, Webb Wire Division, New Brunswick, N. J.

WIRE—Nickel Alloy
Academy Metal Products Co., Hoboken, N. J.

WIRE—Nickel Silver and Phosphor Bronze
Academy Metal Products Co., Hoboken, N. J.
Alloy Metal Wire Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Malin & Co., The, Cleveland, Ohio

WIRE—Oil Tempered
Crucible Steel Co. of America, Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Sheffield Steel Corp., Kansas City, Mo.

WIRE—Silver Plated Copper
Camden Wire Co., Camden, N. Y.

WIRE—Special Shapes
Alloy Metal Wire Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Crucible Steel Co. of America, Pittsburgh, Pa.
Continental Steel Corp., Kokomo, Ind.
National Lock Washer Company, The, Newark, N. J.

WIRE—Spring
Alloy Metal Wire Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
Johnson Steel & Wire Co., Inc., Worcester
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Seneca Wire & Mfg. Co., Fostoria, Ohio
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
Academy Metal Products Co., Hoboken, N. J.
American Steel & Wire Co., Cleveland, Ohio
Carpenter Steel Company, Webb Wire Div., New Brunswick, N. J.
Crucible Steel Co. of America, Pittsburgh, Pa.
Firth Sterling, Inc., Pittsburgh, Pa.
National Lock Washer Company, The, Newark, N. J.
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Steel—Also Coppered and Galvanized Steel
Alloy Metal Wire Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Crucible Steel Co. of America, Pittsburgh, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Seneca Wire & Mfg. Co., Fostoria, Ohio
Sheffield Steel Corp., Kansas City, Mo.
Spencer Wire Corp., Union, N. J.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Straightening and Cutting
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Tinned Copper
Camden Wire Co., Camden, N. Y.

WIRE—Tungsten
North American Philips Co., Inc., Elmet Division, Lewiston, Me.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WRAPPING PAPER—Creped
(See PAPER—Creped Wrapping)

YARNS & TAPES—Insulating
Heineman Corp., Oscar, Chicago, Ill.
Libbey-Owens-Ford Glass Co., Fiber Glass Div., Toledo, Ohio.

YARN TESTERS—
Scott Testers, Inc., Providence, R. I.

The WATSON MACHINE COMPANY
ESTABLISHED 1845
PATERSON 3, NEW JERSEY, U. S. A.

ELECTRICAL WIRE AND CABLE, WIRE ROPE, CORDAGE
AND MASTICATING MACHINERY MANUFACTURERS

WATSON

WIRE ACCUMULATOR TYPE "BP"

THIS UNIT PERMITS CONTINUOUS EXTRUSION OF PRODUCTS TO ⅝" MAX. O. DIA. AT MODERATE SPEEDS WHILE USING SINGLE-REEL TAKEUPS, BY ACCUMULATING AND DISCHARGING AS NEEDED, UNDER CONSTANT TENSION, UP TO 160 FEET OF CONDUCTOR.

IT ALSO PERMITS CONTINUOUS EXTRUSION AT HIGHEST SPEEDS WHERE THE PRESENT DOUBLE-REEL TAKEUP CONTROL RESPONSE IS NOT RAPID ENOUGH DURING THE TRANSFER PERIOD, BY ALLOWING AMPLE TIME FOR SMOOTH CONTROL ACTION TO BE RESTORED.

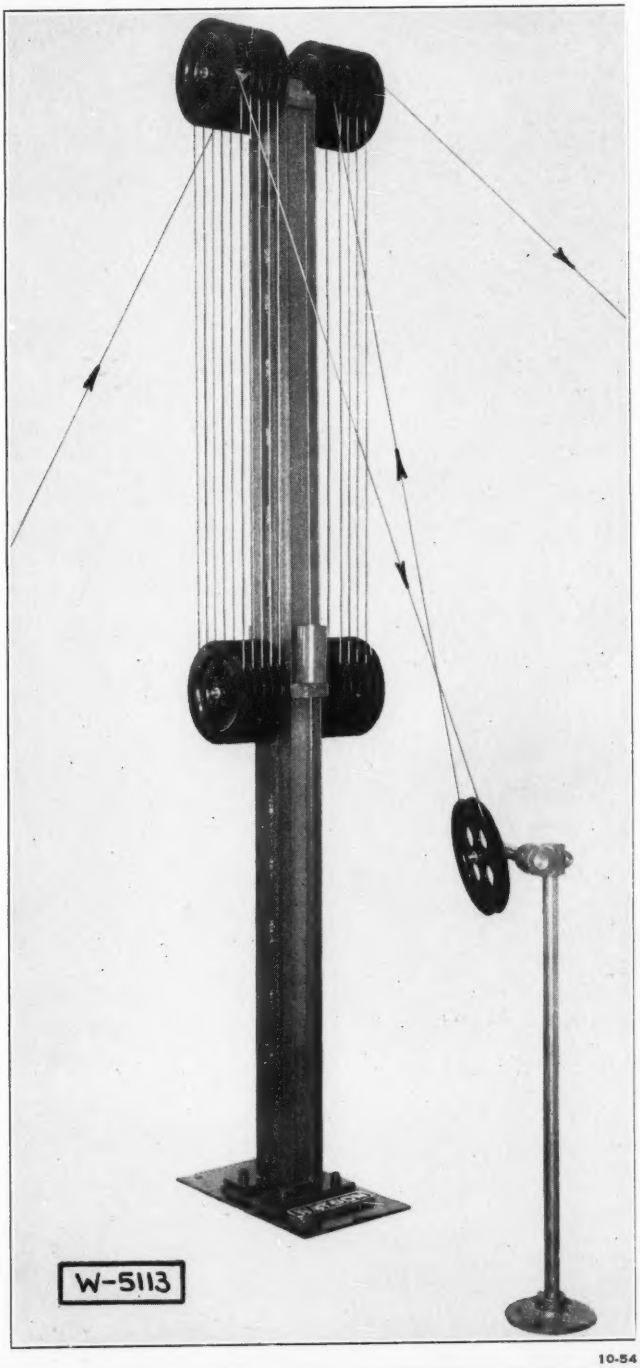
COMPACT DESIGN KEEPS HEIGHT AND FLOOR SPACE REQUIRED TO A MINIMUM.

WIRE TENSIONS QUICKLY ADJUSTABLE TO SUIT REQUIREMENTS.

BALL BEARING SHEAVES.

STAND OF HEAVY, ALL-STEEL AND BALL-BEARING CONSTRUCTION.

LARGER MODEL AVAILABLE FOR CONDUCTORS TO 1" O. DIA.



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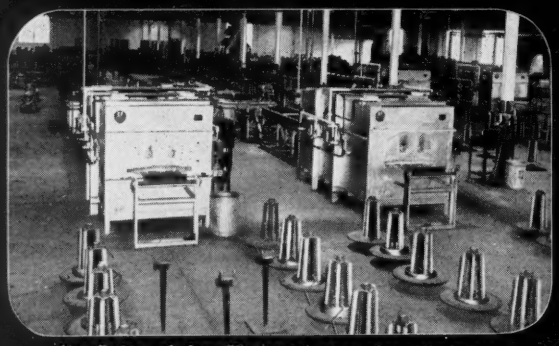
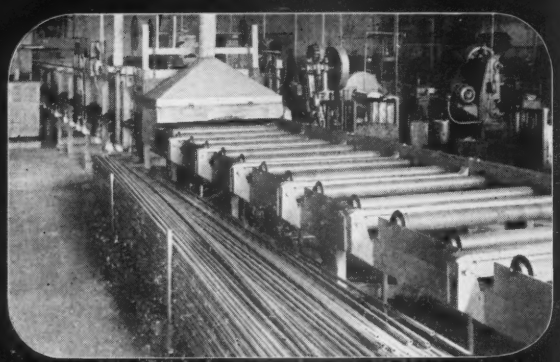
EF Furnaces for Bright Annealing and Normalizing ---- Continuously



Installation of five EF special atmosphere continuous furnaces bright annealing stainless steel wire.

For Wire, Tubing, Strip and other Products



3000 lbs. of steel tubing, per hour, are bright normalized in this EF gas-fired radiant tube type special atmosphere furnace.

We are in position to design, build and put in operation: continuous equipment for hot or cold rolled, high or low carbon, stainless, silicon, tinplate, aluminum, brass, bronze or any other ferrous or non-ferrous metal—for bright annealing, normalizing, galvanizing, aluminizing, tinning or any other process—in the size and type best suited to your plant, process, product or production requirements. No job is too large or too unusual.

Put your production furnace problems up to experienced engineers—*it pays.*

THE ELECTRIC FURNACE CO.

Salem • Ohio

Gas Fired, Oil Fired and Electric Furnaces

Canadian Associates • CANEFCO LIMITED • Toronto 1, Canada

A large capacity continuous strip normalizing, annealing and galvanizing unit. This is a combination EF gas fired radiant tube and electrically heated installation